COAL AGE

Vol. 9 NEW YORK, MAY 6, 1916 No. 19

Human Kindness

Has any man ever received all that he thought was coming to him? It doesn't require an excess of brain matter to decide what we really want. But who ever stops to consider what the other man wants? For example, mine owners and managers often forget that their employees "want the earth" just as badly as they do.

If every man would take a few minutes each day to say to the fellow just below him, "Friend, we're both trying to do the best we can, and while I haven't much time to help you along, I'll promise not to take advantage of you," there would be quite a different feeling in the world. Strange as it may seem, most people could make that exact statement without stretching their conscience or drawing on their imagination.

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Salvaging Old Stock

One tremendous factor of expense in mining is the capital tied up in stocks and repair parts. Many commissaries are filled with things that will never be used. How often the storehouse contains two or three different brands of the same size and general class of packings—perhaps double the amount of material necessary to carry if packings were standardized! This is caused by permitting smooth salesmen to come into too close contact with the under officials at the mine instead of having them confine their efforts to the central purchasing agent's office.

Here's how one large company salvaged its old stock: It was found that a certain store should be closed. The entire stock was transferred to the other company stores. The commissary managers kicked loud and long, but had to take the goods, which were immediately displayed and offered at tempting prices. This old stock, which was still good, was quickly gobbled up at the bargain prices. The general manager of the company was delighted and immediately ordered a general house cleaning in all the stores. It would be wrong to tell how much was found; suffice it to say that the whole organization was awakened, and the result was a determination to do business with as little stock as was necessary to conduct successful operations.

Any mine manager can try the plan. Results are guaranteed.

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Trees, Gardens and Bathtubs

None of us really want to live in a place where there are no trees and call it home. Yet, sad to relate, hundreds of coal camps are barren of nature's cheapest and best ornament. Is this because the people don't like trees or because the company doesn't think they are worth while?

It's a good omen, however, that gardens are becoming more frequent. In fact, some companies have gone so far as to employ agriculturists to teach people how to plant and care for a garden. But here's a tip: There can be no success with the garden idea until the individual plots are fenced.

And speaking of trees and gardens, there's another subject worth mentioning that's just as beneficial and even more essential—bathtubs. How many mine officials would like to give up running water and baths in their houses? Are coal miners different from other people? Does anyone think that the man who digs coal would rather wash in a tin bucket? Company bathhouses can't be used by the miners' families.

Home is still the abode of the heart—not just a place to change one's clothes. Is there such a thing as a mine camp in a grove of trees, with a bathtub in every house and a fenced garden in the rear? Let's hear of it if there is.

Ideas and Suggestions

Timber Waste in Coal Mines

By Forney L. Parker*

Conservation of forests has long agitated the public, and it is a terrible thing to contemplate this world without wood. And yet if all the timber which is wasted in mining alone were saved it would be a material help.

Trees which have attained their maturity only after years of careful attention on the part of nature are cut down hastily, sawed into lengths and in a few hours or days are unloaded at coal mines in different parts of the country. These props are then placed in the mine, and perhaps before very long, because of a squeeze which destroys only a relatively small part of the prop, are discarded and laid by as of no further value. It is this timber that should be utilized again, for if it is taken outside, a small saw can rip up the smaller pieces into slabs and wedges, which are always in demand at mines.

Even timber that is not fit for the sawmill need not be wasted, but may be burned and the ashes sold for potash.

Again with kindling wood selling for fancy prices in the cities, would it not pay the coal companies to save the short ends found on every timber bank, split them up into uniform sizes and ship to the larger towns.

It is quite true that much old timber is used for blocking in the mine, but a visit to any rock bank at the colliery will usually show an immense amount of timber which is slowly rotting away.

So it is not simply a matter of sentiment, but the strictest economy that should encourage us to "spare that tree" a little longer.

What Have You in Your Mine-Supply House?

If there was ever a time when it was the duty of a mine superintendent to see that his stock of mining stores and repair parts was carefully looked after or when a mine storekeeper had the chance of his life to make good on the job, that time is certainly now.

Every day at hundreds of mining plants the lack of foresight in failing to anticipate requirements of mining material is being bewailed—if the language of irate mining men can be called such; or the genius in the shape of a superintendent or storekeeper who possessed foresight is being praised and rewarded. That superintendent who had to suspend operations a few days and beg for certain repair parts is busy explaining his case, while that other boss who ordered a six months' supply instead of the customary two or three is watching his mine run while he makes his storekeeper work up a memorandum of those materials which are likely to go still higher in price and get altogether too scarce for comfort.

I repeat, for it cannot hurt, there was never such a time for superintendents and mine storekeepers to capitalize foresight. Certain commodities necessary to mine operations have been jumping in price like the proverbial cat. Real deliveries are becoming more and more difficult to obtain. Without the continuous application of foresight, hindsight will be in too-marked evidence at far too many mining plants.

Just the other day I ran across two mine storekeepers. One, in reply to the usual, "How are tricks?" said, "Why, I have only one—to write no order for less than a six months' supply." He was a pretty wise storekeeper, too; at least his superintendent said so. The other one delighted himself as well as the local manager, who was showing me around, by calling my attention to the fact that he had purchased so much of this at a certain price and had enough of so and so, which had advanced 30 per cent. in value since he got it in, to last the plant at least ten months. These were live-wire storekeepers. There are others who haven't used that old bean to such good advantage and who are not in high favor at headquarters.

I might mention hundreds of articles used around a coal mine that are becoming harder to purchase every day—lots of them are absolutely essential. You can find all of them in the advertising columns of *Coal Age*. Of course, you know already that when you order certain supplies, which you may need in three weeks, you'll be lucky to get them in six or eight weeks. I might remind you, for example, that white paper such as this is printed on may not be white six months from now and certain colors of paper may be impossible to obtain.

Seriously, it is up to those who follow the mining game to canvass their plant requirements with diligent care. If you have such a storekeeper as I have mentioned, freeze onto him. He will make some money for you in the next year or two, and you can't afford to let him get away.

To those managers and storekeepers who are not quite alive to the present situation, I would say earnestly, trim your lamps and look over your stocks, and above all do not forget that foresight is ahead of hindsight and is 100 per cent. more efficient.

Improving the Power

By W. F. Shutt*

At a certain mine plant in east Tennessee two direct-current generators were installed. These were of 200 kw. and 100 kw. capacity respectively and operated on separate circuits, each at 250 volts. The machines were of different makes, and the management had been advised that they could not be made to operate satisfactorily in parallel. The switchboard was, however, wired for parallel operation, and attempts had been made to run the generators in this manner, but had been given up as failures.

The positive copper line consisted of four 0000 wires for a distance of 3,000 ft., then three 0000 wires for an addi-

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tional 4,000 ft., and two 0000 wires for still another 1,000 ft. From this point the supply lines led to several cross entries, the farthest inby point being about 11,000 ft. from the switchboard.

The negative line consisted of two 30-lb. rails well-bonded with 0000 flexible compressed terminal bonds and in addition one 0000 copper wire for a distance of 7,000 ft. This made a good circuit—in fact, considerably better than the average to be found in small mines.

On taking charge of the plant, I began to study conditions and experiment on the generators in order to get them to operate successfully in parallel. The large generator hogged the load, so I connected a shunt across the series field and tried different sizes of wire until I got the generator to give nearly the same voltage as the small machine for the different loadings. I used for this purpose 150 ft. of No. 2 insulated wire, this being approximately the same length as the series-field coil.

This made the large generator hog the load still more, so I added resistance to the positive cable running from the series-field terminal to the switchboard. First, by way of experiment I added 40 ft. of 0000 wire, cutting this off until I had the proper resistance and the load equalized between the generators. I calculated the equivalent of this resistance in 500,000 circ.mil cable and found it to be 90 ft. plus the old cable, making a total of 110 ft. of this size of conductor. This cable was installed, and the generators now operate in parallel readily.

There are other ways of arriving at the solution of such a problem as this, but the method I pursued can be followed by anyone, a lack of data and instruments on one of the generators causing me to adopt this plan. German-silver wire or an iron log-cabin resistance can be used for providing the shunt and the resistance in the positive cable.

The governors of the engines are set so that they speed up about 2 per cent. on full load, which, with the 10 per cent. compounding, gives 300 volts at the switchboard. This arrangement with the combined copper circuit gives fair voltage throughout the mine and, furthermore, renders the load more uniform.

The load consists of five gathering motors, three haulage locomotives and two mining machines. The conditions are now considered good for direct-current distribution, but it is realized that as soon as the load increases 25 per cent. or more, it will be necessary to change over to alternating current for transmitting the power to the face of the workings.

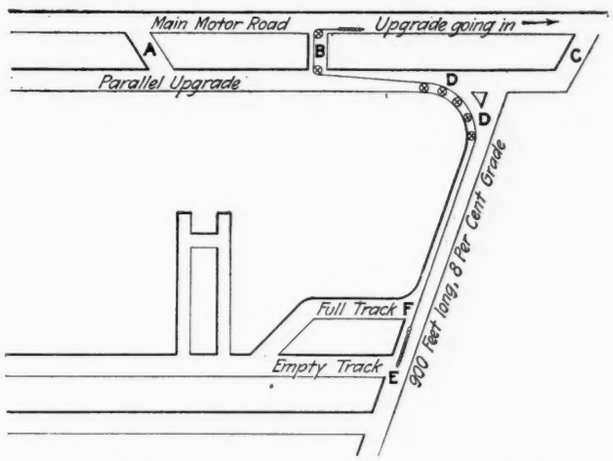
Armature troubles with locomotives at this mine had been bad. These consisted of the melting of solder in the connections of the coil leads to the segments of the commutator, also a number of open circuits and a few burnouts. I found the melting of solder to be due to low voltage and excessive brush pressure, heavier springs having been substituted on the brushes and these being screwed down as tight as possible in an effort to stop sparking. The substitution of lighter, or standard springs on the brush holders and the improved power conditions stopped this trouble immediately.

The open circuits I found to be due to the shells of the commutators being loose on the armature shaft, the lateral play of the commutator breaking the coil leads; while the burnouts were due to a combination of the foregoing, in which short-circuits were formed between the segments or in the coils themselves.

With the aforementioned changes and careful supervision we now have no difficulty, while formerly it was nothing but trouble. Consequently my advice to anyone having motor or power troubles is, do not accept them as necessary evils. By proper study a satisfactory solution may be found.

Solving a Difficult Problem

Some years ago I was employed at a mine where the grades ran from 5 to 15 per cent. We had driven down on about an 8-per cent. grade to open a small block of coal. This was not large enough to permit driving at such an angle as to allow us to use the 13-ton locomotive, which was well able to handle more coal than was then produced for it. A horse could pull only one load of coal at a time up the grade, and it was desirable to get approximately 150 cars per day from this opening. Conditions also were such that a hoist to haul the coal up the hill could not be secured, and it therefore became necessary to devise some means of getting the coal out. The accompanying sketch illustrates how this was done.



SKETCH SHOWING HOW THE CARS WERE HANDLED

The main haulage road coming in was slightly upgrade. When the locomotive came in with a trip of empties, eight would be cut off and dropped through the chute *A* by a boy. These would be brought to a stop at the cutthrough *B*. This cutthrough contained a cable guide pulley, or sheave, at either end. A ¾-in. wire rope would be attached to the cars in the parallel heading, and these would be lowered, dragging the rope with them down to the point *E*, or the empty track.

The rope would then be changed to the loads standing at *F*, or upon the full track. When the locomotive returned with the trip of full cars, the other end of the rope would be hooked to the side of the locomotive at the point *B*, and 8 to 10 cars would be hauled up the hill till they cleared the switch at *D*, where they would be stopped, dropped back and taken out at the chute *C*. It only required about 5 minutes for the locomotive to make the run out with the rope, back in and take the trip out from the point *C*, and couple up to the rest of the trip.

We followed this method of haulage for a long time, or until the work got too much for the locomotive, securing 150 cars per day. In the meantime, a hoist was released from another portion of the mine and put in position for pulling these cars out of this section.

Panel Room-and-Pillar Mining

By A. G. Horrock*

SYNOPSIS—The success of any coal operation depends on the simplicity and efficiency of the methods and apparatus employed. The scheme of mining here described permits of a high degree of concentration, requires only a small amount of narrowwork, and secures large output.

The modification of the "old reliable" room-and-pillar method of mining here described offers all the advantages of panel mining and at the same time greatly reduces the necessary amount of entry driving and other narrowwork. A large daily output, with a maximum of concentration, is obtained from the small area developed.

Experience has demonstrated that the success of any coal-mining plant today depends to a great extent on the general simplicity and efficiency of the equipment used both above and below ground. This is especially true with regard to the underground operations and where it is difficult to obtain a high degree of efficiency on the part of day men, drivers and haulage hands.

When these conditions prevail there is little doubt that this difficulty is due in a large measure to the fact that these mines are producing a comparatively small daily output for the amount of development work done.

When the development is not uniform some parts of the mine advance rapidly and become more or less worked out, while other portions may be left almost untouched, with the result that a few miners become scattered over a large territory. Another result is that supervision becomes difficult and costly, with probably an increased number of accidents.

The scheme described in what follows is one which would tend to eliminate these difficulties and irregularities and should prove useful and economical to operators having favorable mining conditions. It is simply a modification of room-and-pillar mining, with concentration as the chief object in view, and suggests itself through close observation and study of the various conditions encountered. The method is particularly adaptable to measures that are flat or nearly so and ordinarily free from displacements of the seam and reasonably free from water and gas.

Fig. 1 is a plan showing the general development of the mine. Three main entries are driven on the butt, the cross-entries being driven in pairs and on the face of the seam. It will be seen that two of the main entries are used as intake airways, the one to the left being also used as a traveling way, while the center one is the main haulage road.

The one to the right is the main return aircourse and may be driven with a larger cross-sectional area than the others, which are made narrow, say 9 or 10 ft. wide in a 6-ft. seam.

By this arrangement serious interference with the intake air current by the piston-like action of a rapidly moving locomotive and trip is avoided, and the velocity of the air current on the haulage road is reduced and carries less dust.

The distance at which each pair of cross-entries is turned off the main entries will depend on local conditions, mainly with respect to the nature of the roof, with a view to keeping open the panel its entire width without difficulty, and also on the number of rooms and pillars it is desired to work within the panel in order to secure a required daily output.

The width of the pillars to be left for the purpose of protecting the main and cross-entries will be determined by the usual means, such as the thickness and nature of the cover and the physical character and thickness of the coal bed itself.

These factors will of course affect the width of the rooms and pillars in the panel, but to a much less extent, owing to the extremely short period that they must stand, quick extraction of the coal being one of the greatest advantages of this scheme.

Fig. 1 also shows the general direction of air currents on the main and cross-entries and where it enters and leaves a panel. The ventilation is arranged and distributed so that each panel has a separate current of air which can be easily controlled and regulated to meet requirements.

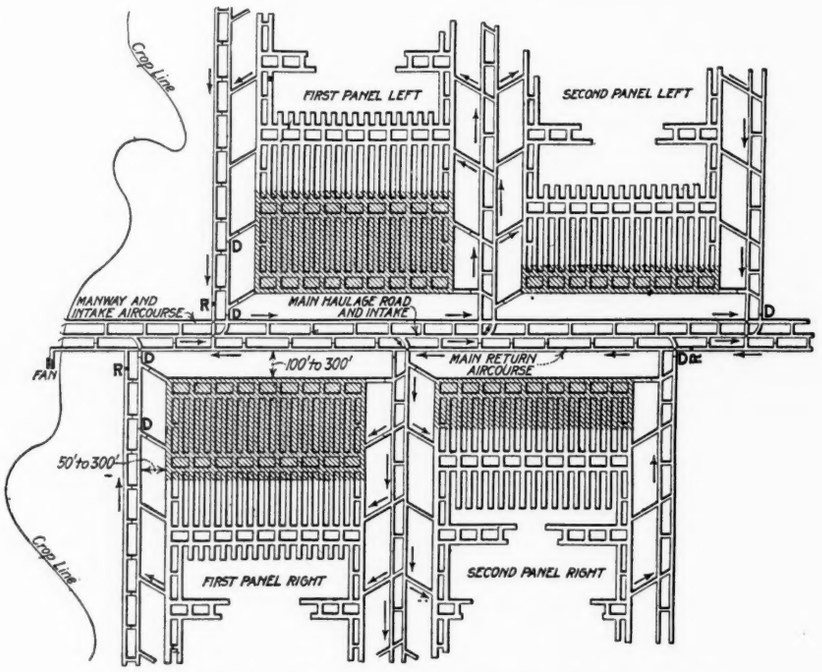


FIG. 1. GENERAL PLAN SHOWING SYSTEM OF DEVELOPMENT

Few openings are driven through the pillars flanking the cross-entries and connecting with the panel, these being only necessary to accommodate haulage and ventilation as the panel advances section by section, while along

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the main entries an unbroken pillar is maintained between each pair of cross-entries.

By these arrangements a panel can be readily and effectively sealed up in case of fire or any other cause that would demand such a step, permanent stoppings being put in immediately following the progress of the worked-out portion of the panel.

Fig. 2 is a plan of the first right panel and shows in detail the general methods adopted in advancing a panel. The arrangement of the ventilation and the direction of the haulage are also shown.

It will be noticed that a scale of air is taken from the intake current on the cross-entry by means of a regulator curtain placed on the haulage slant, to obtain an adequate amount of air to effectively sweep the edge of the falls in the pillar-drawing section of the panel.

In opening a panel, a pair of butt rooms are started, after leaving the required amount of pillar to protect the entries. The first pair of butt rooms may be started from the cross-entry pillars on each side of the panel and driven until they meet; or they may be driven the entire distance from the outby side of the panel simultaneously with the main entries. The latter method will reduce the time required to open up a panel.

As soon as these are connected across the panel, all the face rooms are started together, being turned off the inby butt room, and are continued until through on the next pair of butt rooms, which are turned off in pairs at any desired distance apart, say from 200 to 500 ft., as conditions may demand.

The starting of these butt rooms is so timed that they are connected before the face rooms advance far enough to break through. The first two face rooms on each side of the panel are also driven together, and are kept well in advance so that this will be accomplished. As the first section of rooms is completed the room switches are moved forward to the inby butt room of the next pair, and the next section of rooms is begun in the same manner as before.

At the same time switches are laid in the outby butt room of the second pair and connected to the room tracks previously used. Pillar drawing is started at the back end of the panel, retreating in the same direction and at the same time that the rooms are advancing.

The panel is then in full operation. The face-room pillars are drawn back until reduced to stumps. In the meantime the face rooms have advanced forward another section and the pillar switches are moved up to the outby butt room of the next pair. Pillar drawing is continued, beginning again at the stumps where it was stopped, and the coal is taken out through the new rooms just completed in the same way as before.

Owing to the extremely short time that both face and butt rooms are kept open, all crosscuts can be driven room width, the face room crosscuts being staggered. Room necks are unnecessary.

By this method narrowwork throughout the mine is reduced to a minimum, as all yardage costs are confined to the work along and immediately adjacent to the main and cross-entries. Thus the expense of driving and maintaining butt entries usual in developing a room-and-pillar mine is eliminated.

After pillar drawing is commenced in a panel the action of the roof must be carefully watched. It is highly important that a good roof break be obtained as early as possible and the remaining pillars be relieved of excessive roof pressure. If this is not accomplished in a proper manner and at a proper time there is great danger of having a squeeze or creep, which would seriously interfere with the successful operation of this system.

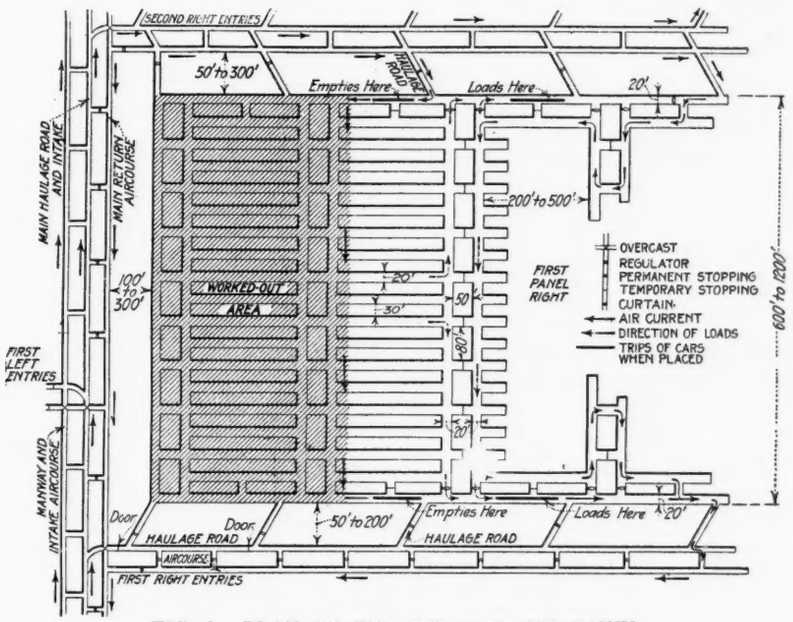

FIG. 2. PLAN OF THE FIRST RIGHT PANEL

However, once this danger period is passed, there should be no fear of any similar trouble, and this period is encountered only once in each panel. Again, the long uniform fracture line offered by a long face line of retreating pillars will materially assist in obtaining the desired results.

To achieve the highest measure of success it is essential that the rooms and pillars be the correct width, so that the roof weight may be utilized in the extraction of the pillars without entailing any undue difficulty in holding the rooms open the required length of time. The length of room is also important, as this will largely determine the cost of tracklaying in a panel with respect to moving the room switches from time to time.

Haulage is simplified and shortened. The coal from half the number of rooms and pillars is taken out at one side of the panel, while that from the other half is hauled to the other side. The output of the panel being divided, it can be handled much easier.

Loads are gathered to a convenient point in the first advance face room on each side of the panel, and heavier track steel suitable for the haulage motor is maintained in these rooms. The motor entering at the head of a trip of empties backswitches to the position shown and picks up the loaded trip with a clear road out and without loss of time. Furthermore, it is at the head of the loaded trip.

Single track only is required and the expense of constructing partings is saved. When the retreating pillars

have reached a point which makes the present haulage slant no longer available for this purpose, the one ahead is used.

In estimating the daily tonnage of a panel much will of course depend on the number of working places obtainable. This again, as stated before, will depend on local conditions with respect to the seam and adjacent strata. With favorable conditions, and where the cover is not thick, the pillars may be reduced in width to mere ribs 10 or 15 ft. wide, thus materially increasing the number of men placed within a panel and the daily tonnage obtainable therefrom.

For example, Fig. 2 shows a panel with 19 face rooms, 4 butt rooms and 18 pillars in operation. All face rooms are shown 20 ft. wide, with a 30-ft. pillar. Assuming the rooms are machine mined, and all pillar coal to be hand mined, one loader is allowed to each room, or two men working together clean up a room in one day. The next room meanwhile is mined and shot down ready for the next day.

In a 6-ft. seam each room when shot down will give from 24 to 28 tons of coal, and taking an average of, say, 12 tons per loader, this gives for the total amount of room coal 276 tons from 23 loaders.

Pillars Retreat as the Rooms Advance

It is essential that the pillars retreat at the same rate that the rooms advance. This will require two miners on each pillar loading 9 or 10 tons per man, or an average of 18 tons per day from each pillar, and requiring a total of 36 miners. This makes a total daily tonnage from one panel of 324 + 276 = 600 tons from 59 men.

These figures are not excessive by any means. With the advantage to the drivers of an extremely short haul and the use of a 2-ton mine car, the output could probably be materially improved upon. In addition, there is easily sufficient entry coal to bring up the total output of the four panels shown developed in Fig. 1 to a daily production of more than 2,500 tons.

The foregoing scheme will compare favorably with any of the present-day methods of mining coal by the room-and-pillar system. Concentration, quick development, safety, economy and efficiency are probably realized as fully as is possible and practicable with any known method.

If it is desirable that a certain output be secured in a shorter time than is provided for in Fig. 1, it can be accomplished by turning off the first pairs of cross-entries, both to the right and left, and at suitable distances allowing the opening up of sections of, say, 10 rooms and 9 pillars next to the outcrop and on each side of the main entries.

These, worked on the face and in exactly the same manner as the rooms shown in the panels, will provide a respectable daily tonnage while the main entries are being developed for the first panels right and left and will not interfere with the method of ventilation to be established later. Nor will these sections endanger or interfere in any way with future developments of the mine.

In the foreging method it is important that ample pillars be left to protect the main and cross-entries, especially where the cover consists of beds of sandstone which are not easily broken, so that if a squeeze occurs within a panel it is confined to that part of the mine and can be readily controlled.

Permanent tracks are required only along the main and cross-entries, these being the only roadways it is necessary to maintain both for haulage and ventilation.

The cost of timbering and repair work generally is reduced to a minimum. Thorough organization with a view to attaining a high degree of efficiency for both workmen and equipment may be effected, while the maximum recovery of pillar coal consistent with safety is possible.

Recent Legal Decisions

Broker's Right to Commission—A broker's right to commission for negotiating a sale of coal is not affected by his employer's unexplained failure to deliver the fuel. (Virginia Supreme Court of Appeals, Kaylor vs. Davy Pocahontas Coal Co., 87 Southeastern Reporter, 549.)

Discrimination in Coal Freight Rates—An order of a state railroad commission allowing a railway company to charge freight rates for hauling its own coal over its own road and to participate in a division of a through rate for so doing is invalid as permitting unjust discrimination. (Texas Court of Civil Appeals, Rio Grande & Eagle Pass Railway Co. vs. Railroad Commission of Texas, 175 Southwestern Reporter, 1,116.)

Expert Testimony in Personal Injury Cases—In a suit for death of an employee caused by a fall of slate plaintiff was entitled to the benefit of the testimony of a mining expert giving an opinion as to the safety of the place where the accident occurred and as to whether proper means were used to support the roof. (United States Circuit Court of Appeals, Walsh vs. W. P. Rend Collieries Co., 228 Federal Reporter, 311.)

Liability for Subsidence of Surface—As between the owner of a mine and his lessee, the one who takes out coal without leaving proper support for the surface is liable for damages to the owner of the surface if the surface subsides. The damages recoverable in such cases are measured by the excess of the value of the surface immediately before the subsidence over its value immediately afterward. (Indiana Supreme Court, Bales vs. Jackson Hill Coal and Coke Co., 108 Northeastern Reporter, 962.)

Guaranty of Quality of Coal Sold—The New Jersey statute to the effect that on sale of a specified article under its trade name there is no implied warranty as to its fitness for any particular purpose is applicable to a sale of "Ralphton Smokeless Coal." If the fuel conforms to that name, the seller cannot be held liable for any defect in quality, in the absence of an express warranty. (New Jersey Court of Errors and Appeals, Quemahoning Coal Co. vs. Sanitary Earthenware Specialty Co., 95 Atlantic Reporter, 986.)

Royalties Under Mining Leases—If the language of a coal mining lease be ambiguous as to the lessee's liability for royalties, it will be interpreted according to any practical construction which the parties may have placed upon it in their mutual dealings. The fact that a lessee did not formally surrender his lease after exhausting the minable coal and continued to use the shaft on the leased premises in removing coal from adjoining lands did not subject him to liability for the minimum annual royalty fixed by the lease, the lease reserving to the lessee the right to abandon it any time on account of thinness of coal. (Indiana Appellate Court, Underwood vs. Vandalia Coal Co., 111 Northeastern Reporter, 329.)

Assumption of Risk by Miner—An experienced adult miner assumes all obvious and appreciated risks of injury by continuing at work under them, and promises to him that props will be furnished him or that other steps will be taken toward making the place safe will not excuse his remaining at work in the presence of known danger. (West Virginia Supreme Court of Appeals, Burton vs. War Eagle Coal Co., 87 Southeastern Reporter, 547.) But a miner does not assume the risk of injury resulting from his employer's violation of a statutory duty to provide an ample supply of timbers and to cause the same to be delivered on the pit car as near as practicable to the place where the same are to be used. The New Mexico statute which makes it a penal offense for a miner to knowingly remain in an unsafe place in a mine does not prohibit a miner from remaining in a room which has an unsafe roof so long as he remains from beneath the unsafe place. (New Mexico Supreme Court, Melkusch vs. Victor American Fuel Co., 155 Pacific Reporter, 727.)

Wire Rope Lubrication

By George R. Rowland*

SYNOPSIS—An efficient wire rope lubricant must be free from constituents which will attack the rope, must remain pliable under all weather conditions, must not evaporate nor be soluble in water, must be chemically inert so far as mine acids are concerned, must be of such a nature as to penetrate between all wires, strands and core, must not decompose, must be highly adhesive, must not harden or peel, and must be capable of a considerable degree of liquefaction. The same lubricant should be used both in rope manufacture and operation.

Wire rope is an appliance well adapted to a multitude of uses. Adaptability in an engineering sense implies both economy and safety. The trend of evolution has practically eliminated the hemp rope in mine hoisting operation, since wire rope excels in economy and efficiency because of its length of life under heavy duty and because of its superiority in strength per unit of cross-section.

Wire rope deteriorates with use, but not with age when properly cared for; but the rate of deterioration depends in large measure upon the character of the metal used, the construction of the rope, the diameter of the drums, sheaves and pulleys over which it operates, and to a still greater degree upon how it is lubricated. A rope may be made with great accuracy and meet every specification that human ingenuity can devise, but if not properly protected from the elements which may attack its constituent parts, value and the desired economy cannot be secured. Consequently, the protection and lubrication of wire ropes are of much importance. This applies to cables lying idle as well as to those in service, since rust destroys as effectively as hard work.

Lubrication Governs Length of Life

The question of efficient lubrication has recently assumed a position of considerable importance in the minds of wire rope manufacturers and purchasers. This in the case of the manufacturers is largely because of the purchaser's demand, in many instances, of a guarantee in regard to the performance and the life of the rope. The manufacturer may use the best technical knowledge at his disposal and be extremely careful in selecting the material which goes into his product, but he cannot be expected to estimate beforehand the rapid and varying degrees of deterioration of the rope when it is in the hands of the user, who it often happens does not fully appreciate that conservation of the life of the cable is entirely under his direction. Even the most perfect rope can be used under such severe conditions and with such lack of attention that it will have a short life, while one of much inferior quality, used under the same conditions of service but carefully taken care of in the way of lubrication, will outlive the higher grade rope. This is common knowledge among all rope users and manufacturers. The whole matter rests upon the efficiency and suitability of the lubricant employed.

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A careful investigation of all steel cables used in mine service has shown that no two manufacturers are using the same grade of lubricant, and an analysis of the materials most commonly employed and recommended for this class of work shows that tar, graphite and other fillers are used in large proportions, this no doubt for the purpose of developing heavy, adhesive mixtures, which are commonly sold under the names of "rope shield," "rope dressing" and "protectors." Such materials have the effect of only partially protecting the external parts of the rope, and at low temperatures will crack and peel. This may be noticeable only in spots, but it has the effect of permitting the deteriorating elements to attack the internal portions of the cable, and instances are not infrequent of ropes suddenly breaking while the visible wires show no signs of deterioration. It is invariably found upon examination in such cases that the internal wires have perished by corrosion.

In some instances ordinary black oil, or what is commonly known as "waste oil," is used. Both of these materials are worthless as a rope lubricant, as neither will cling to the outer surfaces, penetrate to the core, nor resist the effects of moisture or other damaging elements. Where such materials are used, frequent applications are necessary; and owing to their characteristics, they afford no lubrication to sheaves, drums and pulleys, and are either thrown off or evaporated within a few hours after being applied, thus leaving the rope at the mercy of the elements and of frictional wear.

Many high-grade and expensive greases have been used which perhaps by laboratory analysis are shown to possess the qualifications necessary for resisting the effects of moisture and chemicals, but which on account of the high speed at which ropes are often run and the consequent stress and vibration to which they are subjected are readily thrown off and at no period after application afford more than a temporary protection to the external surfaces of the rope.

It rarely occurs nowadays that the full efficiency of a rope is developed, owing to service conditions requiring it to come into contact with water containing deteriorating elements which have the effect of quickly producing corrosion and consequent brittleness of the wires. Furthermore, the higher the carbon content of the metal the more susceptible are the wires to this corrosion.

A series of practical tests conducted by a number of high-grade technical men under the supervision of the writer has demonstrated that the use of a poor or unsuitable lubricant will often do more to lessen the durability of a rope than using no lubricant at all and that the cost of a lubricant that will meet all operating conditions is trifling as compared with the saving which its use makes possible.

An efficient wire rope lubricant must be free from any material that will attack the constituent parts of the rope, must remain soft and pliable under all atmospheric conditions and must not be subject to evaporation. It must be insoluble in water, so as to prevent water from coming into direct contact with the surfaces of the rope, and must be unaffected by water heavily charged with

chemicals which are encountered in mine operation. It must be of such a nature that it will penetrate between the wires in the strands and between strands to the core of the rope, preserving the latter as well as the metal which surrounds it. It must not be subject to decomposition under the severest conditions of wear, and must possess great adhesiveness, so that it cannot be thrown off by any force. It must be a material that will not harden nor peel, either through too frequent application, as is often the case, or under low temperatures, and must be of such a nature as to permit of its being liquefied to a consistency to permit of application being made while quite thin.

In addition to meeting these requirements, the lubricant used for wire ropes should possess characteristics which permit of its showing equal efficiency as a lubricant for sheave wheels, drums, pulleys or other machine elements over which ropes are likely to be passed. And to secure the greatest degree of efficiency this same material should be used to lubricate each wire in the strand and to saturate the core during the process of manufacture, as it often occurs that with the use of one material in the manufacture and another after the rope has been put into service, the two being of decidedly different nature, no lubrication can be effected on account of one material preventing the other from adhering or penetrating to the interior of the rope.

Initial Lubrication Is Important

Too little attention has been given to the initial lubrication of wire ropes, particularly as regards proper saturation of the hemp core. It has been the general practice to pass the hemp center through the lubricant used at the time the rope is laid up. When applied in this manner, the greater part of the lubricant is forced out between the strands and, in the case of some grades of lubricants, drips entirely away from the external surfaces. The object of inserting the hemp center is to increase the flexibility of the rope, and the deterioration of this element has the same effect as the deterioration of the material surrounding it. If the hemp center is thoroughly lubricated before being inserted into the rope, it will act as a container of the lubricant and will assist in distributing it to all parts of the cable; also, if the proper lubricant is periodically applied it will penetrate and maintain the hemp center as a continuous lubricator.

A Good Method of Application

Another important feature in connection with wire rope lubrication which has not as a rule received proper consideration is the method of application. In some instances the lubricant is poured onto the rope either at the sheave wheel or at the drum; in other instances it is applied with a brush. Both of these methods are crude and wasteful. The proper way to apply the lubricant is to use a split box of sufficient dimensions to permit of its holding about 25 lb. of the lubricant to be used. This should be constructed with a hole in the center large enough to permit of the passage of the largest rope in the mine, and when coating smaller cables an old rubber pump valve or a piece of ordinary burlap wrapped around the rope may be employed to act as a wiper and regulate the thickness of the application. These split boxes can be constructed so as to be used on either vertical or horizontal ropes.

The lubricant should be thoroughly liquefied in a metal container, and after it is poured into the split box the rope should be permitted to pass slowly through it. In this manner an economical and uniform application can always be made. Wherever possible, the external surfaces of the rope should be dry when the lubricant is applied.

A series of practical demonstrations, carried out with the coöperation of the manufacturers and users of wire ropes, has been made by the technical forces of the Texas Co. These demonstrations have covered the most severe conditions to be found in mine operations and have resulted in vindicating the contention of the firm of having produced a wire rope lubricant which will meet all of the requirements set forth in this article as being necessary for economical and efficient wire rope lubrication.

The Waste of Coal

There is no denying the fact that there exists a waste of coal. A vast amount of coal is left behind in the mine because under the present wasteful industrial system colliery companies make bigger profits by working the better beds only.

Prof. W. Bone, chairman of the committee of the British Association of Fuel Economy, says that the wastage represents about 25 per cent. of the coal produced. He urges that the coal ought to be brought up to the pit mouth and there transformed into useful forms of energy. He further shows that in his country 52,000,000 tons of coal is used per year in power production at mines and factories, this being equivalent to 5 lb. of coal per horsepower-hour.

He declares that by using the best type of modern boilers and turbines the consumption need not have exceeded 2 lb. per horsepower-hour, and with gas producers and gas engines it could have been reduced to 1 lb. per horsepower-hour. "Supposing that for power-raising purposes," he adds, "we had been able to replace all the inefficient units with the most efficient, we should have saved 40,000,000 tons of that 52,000,000."

The agitation in favor of fuel economy is undoubtedly strong, and there are those who insist that a time limit should be fixed beyond which the wasteful beehive oven, for instance, should not be permitted.

A CASE WHERE THE TAIL WAGS THE DOG

Car Dumpers in Water Shipping

By Scott W. Linn*

SYNOPSIS—It is important commercially that ships be loaded and unloaded as quickly as possible. To accomplish this, car dumpers have been built which hoist a railroad car full of coal and tip it sidewise until its contents have been discharged into a chute leading to the ship or barge hold. With some machines cars may be thus dumped at the rate of nearly one per minute.

As a general thing coal is mined a considerable distance from where it is used as fuel, and must be carried from the mine to the consumer by whatever means are available. The railroad of course enters into the transportation field as the largest factor. To many manufacturing districts and centers of distribution this is the only means of shipping.

It is customary, however, wherever practicable in long hauls to ship by water. The rapid increase in the quantity of ore and grain shipped from the Lake Superior district to the lower lake ports has correspondingly increased the shipment of coal and other Northwest-bound freight by boat on the return trip. It is a matter of no small commercial importance that as little time as possible be consumed in loading as well as in unloading cargoes. The increase in the size of lake freighters has also been an important factor in the demand for rapid and efficient means of transferring cargo from car to boat, and vice versa.

Coincident with the introduction of improved methods for handling coal, ore and other material came larger rolling stock on the railroads and larger boats for lake traffic. The development in the size of cars and vessels and a rapid increase in the consumption of fuel by the territory served by the upper lakes augmented the demand for improved means in cargo handling.

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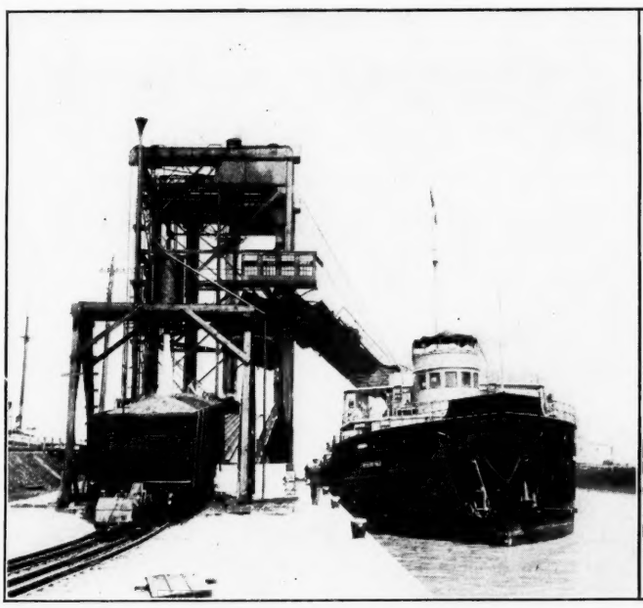
The first coal shipped by boat to Lake Superior was 61 years ago, when less than 1,500 tons passed through the Soo. Loading and unloading was done mostly by shovel and wheelbarrow. About 15 years later the first coal for commercial purposes was shipped to Duluth. The banner year for coal shipping on the Great Lakes was 1913; but while there has been some falling off in 1914 and 1915, these figures nevertheless show a marked increase over the tonnage of 10 years ago.

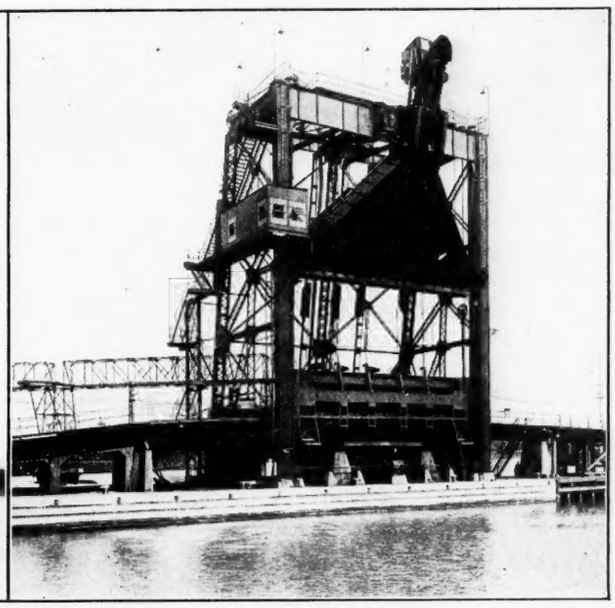
It is the author's intention to confine this paper to a description of car dumper plants and their accessories. For information necessary in the preparation of this article and for the illustrations I am indebted to Mr. Monroe, of the Brown Hoisting Machinery Co., Mr. Lovell, of the McMyler Interstate Co., and Mr. Hulett, of the Wellman-Seaver-Morgan Co.

There are many appliances for transferring coal from cars to boat and for retransferring it at the end of the voyage to storage yards or cars. One of the common methods of transferring the coal from car to boat is by means of a machine known as a car dumper. Twelve or more harbors where car dumpers are used are located at various points on Lake Erie. There are also at this time car-dumper plants at several ports along the Atlantic Coast. Several machines of this kind are in use in Australia and South Africa, making approximately 50 machines in operation at present.

One of the earliest car dumpers was built by Mr. Lindsey about 25 years ago, and was erected in Cleveland. This was in use for several years. The machine stood 45 or 50 ft. above the level of the dock, with an inclined approach for the entrance of the loaded cars and another incline at the opposite end of the machine for the discharge of the empties. Loaded cars were pulled or pushed up the grade to the machine, and were then turned over to dump the coal, brought back to a horizontal position and let down the outgoing track by power.



WELLMAN-SEAVER-MORGAN DUMPER AT SANDUSKY



McMYLER-INTERSTATE DUMPER AT CONNEAUT

At about this time—whether a little earlier or later I am not informed—a car dumper was designed by G. H. Hulett, and was installed on the Lake Shore Ry. at Ashtabula, Ohio. Another was put in service on the Baltimore & Ohio R.R. at Fairport. These machines were so made that the car was tilted endwise, allowing the coal to discharge from the end of the car. This required a specially designed car with an end that was either removable or hinged.

Another early type of car dumper carried a large cylinder into which the car was pushed. This was hoisted and revolved so that the car was dumped over the side. Still another type turned the car over sidewise, dumping the coal into tubs, which were in turn hoisted and run out on a track and dumped into the hatchway of the boat.

Capacities Have Increased

Lake freighters at the time car dumpers were first employed carried a cargo of from 500 to 800 tons, and freight cars were built for about 20 tons' capacity. At the present time boats carrying 12,000 tons are common, while some are in use on the lakes with a cargo carrying capacity of 14,000 tons. Some railroad cars are built with a capacity of 90 tons, while a few roads are making provision for cars of 100 tons capacity each.

The success of unloading coal by the car-dumper method was indicated by the earlier machines. This led to the development of a dumper having a hoisting capacity of 170,000 lb. and an operating speed under normally favorable conditions of 25 cars per hour. This size and capacity remained about the same until 1910.

In selecting a location for an unloading plant it is of course essential to have the requisite harbor facilities. Usually a slip at right angles to the shore is provided for the boat while loading. In addition to harbor facilities, it is of great importance to have a well arranged system of tracks for nearby storage of loaded cars and also sufficient yard tracks to receive a large number of empties. While general layouts vary greatly according to location, a short description of a rather complete track layout will illustrate the problem in general.

The Arrangement at South Amboy

At the South Amboy plant there are several slips extending from 1,400 to 2,200 ft. at right angles to the river front. The piers between these slips at one time carried high trestles, from which drop-bottom cars were unloaded into boats. The trestles on one pier were removed and a car dumper erected on each side, one in 1909 and one in 1910. The tracks were rearranged to suit the dumper plan. A general storage and classification yard is located at some distance from the immediate vicinity. Trains of loaded cars of the proper classification of coal are brought in as required. These are pushed over a hump about 1,800 ft. from the car dumper to service storage tracks on a grade varying between 1.4 per cent. and 1.8 per cent. toward the dumper.

The loaded-car service tracks are about the same for each machine and are arranged right and left hand in reference to the pier, with the empty-car tracks on the lower level between, with a downgrade of ½ to 1 per cent. away from the dumper.

The brakes are set on the loaded cars, which are left standing until required at the machine. When wanted, a car rider releases the brakes on the car nearest the unloading plant. This car then descends by gravity, passing over the haulage-car pit to a stretch of level track about 175 ft. from the dumper. The haulage car, pig, mule, donkey, barney or groundhog—as it is variously termed by different operators—is a small car of proper design running on a narrow-gage track between the rails of the standard-gage track entering the loading end of the dumper. At the bottom of the grade leading to the dumper is a pit, into which the haulage car descends on a vertically curved track to a depth sufficient to take it entirely below the level of the main rails.

The haulage car is controlled by the haulage engine and ascends the curved track to where the narrow-gage track is on a level with the main rails before engaging with the loaded car. The haulage car then pushes the loaded car up an incline with a grade of about 10 per cent. and onto the platen rail of the car dumper. The cradle and car are then hoisted to a distance determined by the height of the boat. The car is automatically clamped to the cradle as it is being hoisted and is then turned through an angle of 135° to allow the coal to run out into the pan.

The cradle is then lowered to its original position and the next loaded car pushes the empty off the platen rail. The empty descends a grade corresponding somewhat to the one entering the dumper and runs up a 25 per cent. incline to the kickback. Returning it takes a spring switch and runs by gravity out into the empty-car storage yard.

A Pan Receives the Coal

The pan into which the coal is dumped is of triangular form, the side next to the machine being somewhat longer than a car. The pan converges to approximately the size of the telescopic chute which carries the coal to the hold of the boat and distributes it as required. This pan is hinged so that it may be swung up to approximately parallel and close to the face of the machine in order to clear the rigging or other obstructions on the boat. It is also carried on vertical screws to allow raising and lowering to accommodate boats of different heights.

The spout from the pan is telescopic in form and so hung as to allow swinging in any direction. This permits coal to be distributed in the boat with little breakage and also places the material properly in holds of various depths. The chute is raised and lowered or swung by a 35-hp. motor, and the necessary gearing and drums are located near the end of the pan. This is controlled by an operator in a cab carried by the pan and so situated that he has a clear view of the spout and the hatchways at all times.

Where classified coal, such as anthracite, is being handled, it is sometimes necessary to screen the material. For this purpose screens are placed in the bottom of the pan of one of the dumpers. The screens are adjustable and are operated by levers so that a proper grading of coal may be had. The screenings fall through into a conveyor hopper and are taken away by chain or belt conveyors direct to cars provided for that purpose or to storage bins arranged over tracks where cars may be loaded as required.

At this plant one of the dumpers was designed to hoist a combined load of coal and car of 170,000 lb.; the other was built for a load of 224,000 lb. Each machine was designed to handle 25 cars per hour. Since

these machines were installed in 1909 and 1910 the capacity of dumpers has been largely increased, and the machines built for plants erected at Conneaut, Cleveland, Sandusky and Toledo have all been designed to handle cars of 100 tons' capacity or to lift a total weight of car and coal of 280,000 lb. at the rate of 40 cars per hour. In each of these latter installations, I am informed this rated capacity has been exceeded up to nearly a car per minute for a short period. One case is reported when 90 cars were handled in 95 minutes.

The principle of operation employed in the later types of car dumpers has remained about the same as in former installations. All parts have, however, been made heavier, clearance dimensions are greater and many of the troubles arising from crudeness in design have been eradicated. There is a tendency in the later machines to use motors for the minor functions of the machine, such as operating the chute.

In some of the newer machines the car turns through an angle of 160°, thereby insuring the entire discharge of the car under all circumstances. In the older types, when the coal did not always flow freely, its discharge was accomplished by means of bringing the car partly back to normal position and rocking it back and forth until all the coal had been discharged.

The engines used in operating the major functions of the machine are of the two-cylinder type and are so constructed that they have considerable surplus power to take care of sudden and excessive loads and consequently are not liable to be stalled under ordinary circumstances.

One of the modern plants is that installed by the McMyler Interstate Co. for the Pittsburgh & Conneaut Dock Co. at Conneaut, Ohio. This plant unloads coal shipped over the Bessemer & Lake Erie R.R. The general storage and classification yards are located at Albion, about 15 miles from the harbor. Trains of coal are brought in from Albion to service storage tracks, of which there are four with a total length of 4,800 ft. The empty-car yard has a storage capacity of about 1 mile of tracks.

The loaded car in descending from the hump passes down a 2.1 per cent. grade, runs past the machine to a kickback, which diverts the car by means of a spring switch to a track leading into the dumper. It is here picked up by the haulage car and pushed onto the platen rail. The practice of having the loaded car go to the kickback before entering the dumper is followed at several plants. Its position, in any case, is determined by the layout of the slip and tracks.

CAR DUMPERS OF THE HOCKING VALLEY R.R. AT TOLEDO, OHIO

Kickbacks have usually been made of wooden trestle, with an incline of from 15 to 25 deg. At the Conneaut plant, however, W. S. McFetridge, of the Bessemer & Lake Erie R.R., designed a concrete kickback carrying a curved rail.

The haulage car here employed is somewhat different in design from that in the plant previously described, in that it has a counterbalanced arm which drops down on the return trip, after having pushed the loaded car onto the platen rail. This gives a comparatively low haulage car, and the pit is so arranged that the loaded car can be run into position from the kickback before the haul-

age car has returned to its pit; that is, the pit extends farther toward the machine, and the haulage car can return under the loaded car.

This gives a little more speed to the operation and also requires a less distance from the car dumper to the kickback. After the car has been dumped it is pushed off by the next loaded car and descends a 3½ per cent. grade by gravity to the empty-car storage yard.

This machine has a platen rail 52 ft. long and an inside clearance of 53 ft. It has a lifting capacity of 280,000 lb. of car and coal. On this machine, as on other makes, the cradle is counterweighted. The counterweight consists of 60 tons of iron punchings contained in two steel cylinders on the rear of the structure, carried by wire rope passing over sheaves on the top.

The haulage car is operated by an 18x24-in. double-cylinder engine. Hoisting is performed by a 22x30-in. double-cylinder engine. The pan and screws are operated by a 150-hp. motor. To facilitate the distribution of coal, a mechanical trimmer is employed.

Several successful trimmers are in use on dumpers, but probably one of the simplest and most efficient is that designed by S. J. Blake, of Conneaut, and used on this dumper as well as on a number of others. The chute and trimmer are operated electrically. Every part of this machine is made of the best of material, while a number of unusual refinements have been introduced which are not often required on machinery of this character, and for which the owners are responsible.

A Rapid Piece of Construction

In the winter of 1914 and 1915 an old car-dumper plant on the Cincinnati, Hamilton & Dayton Ry. dock at Toledo was removed and replaced by a new and modern machine built by the Wellman-Seaver-Morgan Co. As Toledo is an important shipping point of this railroad, it was desired to operate the old plant until the close of navigation in 1914, and an effort was made and realized to have the new plant in operation at the opening of navigation in the spring.

Work of dismantling the old plant was begun shortly after Dec. 1, and the new plant was completed and ready for operation before Apr. 15, 1915. In less than six and one-half months after the contract was awarded for the construction of the car dumper the plant was in successful daily use. This was remarkably good time, when the large amount of work required in constructing the docks and foundations is considered. Ice jams caused some delay in the construction work.

This plant has a storage capacity of 140 loaded cars and tracks for 96 empties. Nearby there is a classification yard with a track for 3,000 cars. In this plant, as in the one at Conneaut, the loaded car passes to the kickback before entering the dumper. The haulage car, while of a different design, performs its function in about the same manner. The machine was also designed to lift a load of 280,000 lb. with an unloading capacity of 40 cars per hour. A speed of nearly a car per minute has been attained in actual operation.

The platen rail is 30 ft. above the level of the dock, which is about twice the height of that on many similar plants. By having this extra elevation the car does not have to be hoisted very high before dumping. The boiler plant is supplied with two 250-hp. Scotch marine boilers. A sprinkling tank for wetting down the coal just before dumping is located between the haulage car pit and the dumper. Sprinkling is practiced at a number of plants.

Another plant modern and complete in detail is that built by the Brown Hoisting Machinery Co. on the dock of the Hocking Valley Ry. in Toledo. Two car dumpers were constructed at this plant, one located on either side of the pier, similiar to the arrangement at South Amboy. The capacity of these machines is about the same as for the other recently built plants. There are three engines—one haulage, one hoisting and one to operate the pan and screws. The chute is operated by motor.

The Power Equipment

The boiler plant used in connection with this dumper contains three 375-hp. marine type boilers. Two 75-kw. direct-connected, direct-current generators are located in a room of the boiler house—one for the chute motor and one to furnish light. The 125-ft. stack is of reinforced concrete carried on piling. Coal for fuel supply is delivered to a spur from one of the empty-car tracks, and when drop-bottom cars are used the fuel is lowered into a bin under the tracks at the side of the boiler house, whence it is conveyed to suspended bunkers made of Ferroinclave, a product of the Brown Hoisting Machinery Co. The firing is done by mechanical stokers.

The modern car-dumper structure occupies a space about 40x60 ft. between corner posts and stands about 90 ft. high over all. Car dumpers are made to handle all classes of cars used in the coal trade. The advantage claimed by the car-dumper method of unloading coal to boats is based on several considerations, among which are: Less breakage than by other methods, especially when grab buckets or trestles are employed; there is a greater capacity at a less cost per ton; and as against trestles, a much less cost of maintenance.

No comparison is here made or intended of the relative merits of the various makes of car dumpers. All such machines are apparently capable of delivering coal in excess of their rated capacities.

Where coal is handled at the rate of 3,000 to 4,000 tons per hour a forced shutdown is a serious matter, and usually every precaution is taken to prevent delay. In several of the plants where two machines are provided, one will take care of all the coal handled under normal conditions; but by having two machines loss of time due to breakdowns may be averted. The rate at which a car dumper may be operated up to the commercial limitations of the machine depends largely on the track arrangement or on the facility with which cars may be delivered to the service tracks. It is also dependent on the handling of the boats to be loaded. This matter is an important factor where barges carrying only 500 to 800 tons are employed. At some of the plants on the seaboard the bulk of the coal is unloaded to such barges.

The Rocky Mountain Coal Mining Institute will hold its next meeting at Salt Lake City, Utah, June 15, 16 and 17. Secretary, F. W. Whiteside, Denver, Colo.

Attention Is Called to the double-page announcement (pp. 46 and 47, Buying Section) of a notable series of articles covering the subject of underground coal mining more thoroughly than has ever been done before. This series of practical articles by the country's leading engineers will be worth hundreds of dollars to everyone engaged in mining coal. A further announcement will be made in an early issue of "Coal Age" giving the names of still other engineers who have promised to contribute to the series.

British Miners Exempt from Military Service

A revised list of certified occupations has been issued, in which the work of men in the occupations named is regarded as of national importance. Subject to the provisions as to individual certificates contained in the regulations and instructions, the classes of men who are employed or engaged in these occupations and who fulfill the conditions specified as to age, marital condition and date of entering their present occupation are exempted from the provisions of the Military Service Act, 1916, or from being called up for military service if they are voluntarily attested men. Men who on Nov. 2, 1915, were unmarried, or were widowers, without any child dependent on them, are to be treated as single men for the purposes of the list.

In coal mining the following classes of men are exempt: All men below ground; above ground—colliery fitter, colliery mechanic, electrician, pumpman, weighman (including checkweighman), winding engineman; central rescue stations—technical staff and permanent rescue corps.

Extracts from a Superintendent's Diary

During the past month I have been made to realize that a superintendent's success hinges largely upon his ability to gather a corps of efficient mine foremen. A few years ago I would have found it difficult to have made such an admission even to myself, but I realize now that my admiration of my own powers at that time was founded largely upon unwarranted assumptions.

It has happened that during the past six weeks I have been called upon to fill three vacancies in my mine foremen's ranks, but up to the present time I have been unable to secure men who seem to be capable of filling the vacancies in the manner in which they have been filled. Most of the men whom I have given consideration in connection with the position seem to have an idea that a mine foreman is a sort of human phonograph whose principal duty consists in repeating orders. They keep emphasizing the fact that they are willing to refer all matters to the superintendent for decision, and from their talk one would gather that they look upon the superintendent as a man of very great authority, yet withal one who has no occasion to delegate authority to subordinates. This willingness to lean on another for advice does not hinge on lack of faith in their own ability, but rather on the idea that such submission is just what is expected of them.

It does not seem to occur to them that conditions in coal mines often change over night and the only man capable of handling some of the problems is the man in immediate charge of the particular operation. To withhold decision until another could be consulted would often jeopardize an entire property.

As matters now stand, I have suddenly found myself reduced to a sort of general mine foreman and most of my time has been taken up discussing problems in ventilation and drainage, or in making yardage adjustments, etc. The experience recalls the reviews that used to occur just before examination time back in my college days.

During the last six days I have not had more than one hour's time to devote to my regular duties.

To cap the climax I received a letter from our general manager today, requesting me to accompany him on an inspection trip to another part of the state next week. During my absence the men whom I am trying out will either become accustomed to running things on their own initiative without suggestions from my office, or else they will meet with disaster and not only ruin their own chances for promotion, but put my administration on the defensive as well.

It is possible that the experience that I am just going through will have some influence on the future dealings that I have with my own superior officer. At any rate I will hesitate a long time before asking him for suggestions.

Colliery Machinery

Referring to the question of supplies in an address before the Northern Colliery Officials Association (English), T. Campbell Futers expressed astonishment at the enormous amount of oil wasted every year, simply because of the lack of efficient men to wield the oil can. He doesn't think it too much to say that 30 to 50 per cent. of the oil used at a colliery is wasted merely for want of intelligent application.

The most efficient of all plant employees at a colliery are the cheapest. Efficient machinery should run from one year's end to another without risk of breakdown, heavy wear and tear or heavy maintenance costs. Too little attention is given to the design of colliery machinery. More attention will have to be bestowed on machine mining to deal with reduced output and higher wages.

A Further Heavy Restriction on British Exports

The freight and shipping department of the British Board of Trade has issued the following order concerning coal exports from that country:

> In view of the present scarcity of tonnage and the increased demand for coal, the supply of which is diminishing owing to the war, and to the practice of some ships trading regularly with British coal outward to Norway, Sweden and Denmark, returning to the United Kingdom in ballast, although cargoes urgently required by the allied countries are available, His Majesty's Government announces that on and after Apr. 25 it will not be possible to allow coal to be loaded in any ship (other than regular liners) proceeding to these countries, unless that ship is already fixed to the United Kingdom or allied country, or holds a certificate from the Board of Trade that no cargo is available.

The Liverpool *Journal of Commerce*, commenting on this order, says:

> From the point of view of the British coal export trade, which has already suffered acutely from want of sufficient shipping to do its work and is, as a matter of fact, just now almost wholly dependent on neutral shipping, the new order will hardly be received with satisfaction. It means that the supply of tonnage offering outward will be further reduced, for, with cargoes to load at a home port, to be discharged at an allied port before running to a coal port to load, considerably longer time will be involved in the voyage and steamers will not be able to return to the coal ports with their usual dispatch. Consequently, coal shippers will probably have still less tonnage at their command under the new regulation, and this they fully realize, as comment on the coal exchanges already attests. At the same time, these neutral steamers will be doing more and better work for the world. With tonnage so scarce as it is just now, it is an unjustifiable economic waste to have steamers making regular trips across the North Sea in ballast. If the coal exporters suffer some disadvantage, the country at large will profit, and that of course is what matters most.

Meeting of the Franklin Institute

Demonstrations of transcontinental and wireless telephony will be given in the hall of the Franklin Institute, 15 So. 11th St., Philadelphia, Penn., during the afternoon and evening of Wednesday, May 17, by courtesy of the American Telephone and Telegraph Co. The program will be as follows: 3:45 p.m., telephone and talking moving pictures; transcontinental telephone demonstration from Philadelphia to San Francisco; wireless-telephone demonstration, by wireless from the Arlington Tower of the Navy Department at Washington to New York, and by wire from New York to the audience in the hall of the Institute. The evening demonstrations will be divided into three periods of about 45 min. each, the first starting at 6 o'clock, the second at 7:15 and the third at 8:30, at which there will be full transcontinental demonstrations, telephone and talking moving pictures.

Medals will be presented to Theodore William Richards, John J. Carty and the American Telephone and Telegraph Co.

Large Anthracite Breakers

At one time it was the custom to erect breakers for every anthracite mine opening, but recently this practice has changed and large breakers are built to prepare the output from several mine openings. The economies introduced by this method appear in the haulage, ventilation, construction, repair and labor accounts to such amount that it is permissible to incur considerable expense to carry out the system.

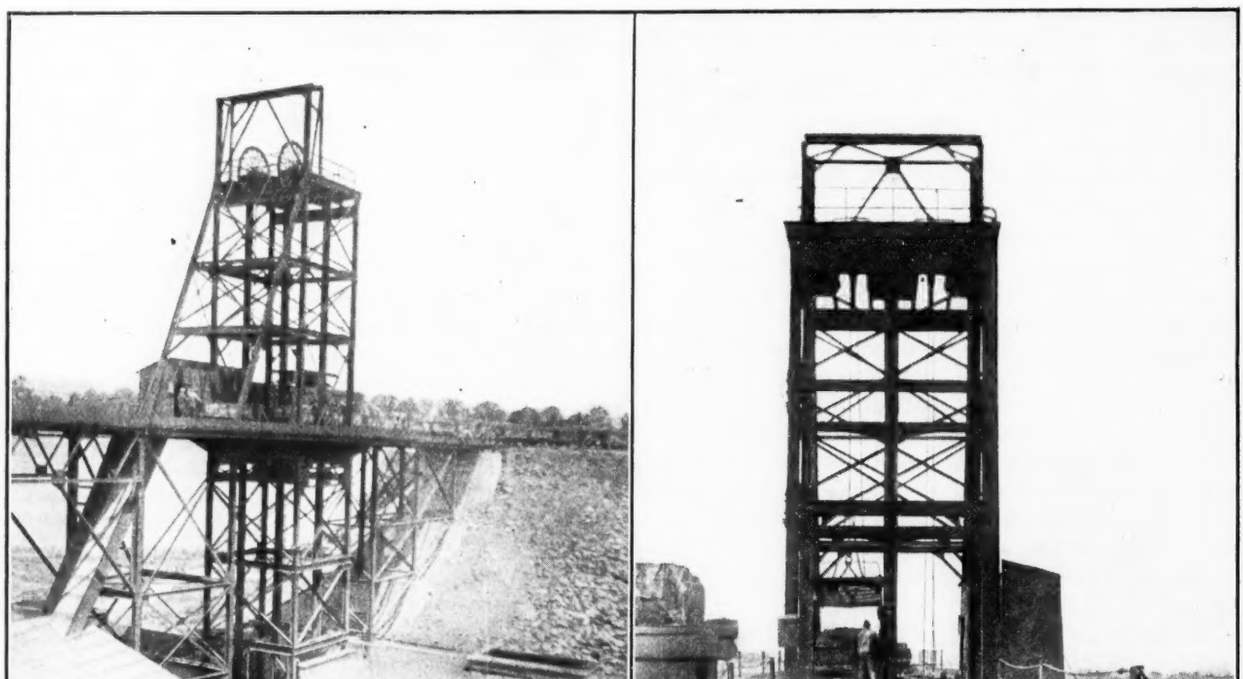
The cost of hauling to the breaker is reduced by the shortening of the underground haul; by lessened congestion of traffic at the shaft bottom; by the decreased number of accidents underground, and by the opportunity afforded to examine the mine cars at the surface. It is also possible to keep the force in the breaker more steadily supplied with coal and thus economize in this direction.

Ventilation cost is reduced by lessening the distance over which air is coursed under ground before it is returned to the surface. When the power cost for ventilation is calculated, it will be found to increase rapidly as the mine galleries are extended, for which reason more than one opening may be advisable on account of this item alone.

Probably the cost for ventilation at anthracite collieries will vary from 1 to 5c. per ton of coal mined, depending on the care taken to economize in this direction. As an illustration it is assumed that one horsepower-year will cost $20 and that 200 hp. is required to circulate 100,000 cu.ft. of air per min. The cost will thus be $4,000 per year. To bring the cost of air to 2c. per ton will require an output of 200,000 tons of coal. But to the power cost must be added fan attendance, oil, waste, repairs, depreciation, interest, insurance, taxes, etc., which will increase the total cost to probably 3c. per ton. As the mine galleries are advanced, the power must be increased or the volume of air reduced. In either case, however, the cost of ventilation will be more per ton.

It is cheaper to construct one large breaker than two smaller ones capable of handling the same tonnage; also it is less expensive to keep one breaker in repair than two. The reduction from four bosses to two, and in loaders and other helpers in almost a similar proportion, furnishes considerable economy.

The Pennsylvania Coal Co. under the management of Capt. W. A. May has used several openings for a number



FIGS. 1 AND 2. THIS HEADFRAME AND LANDING ARE LOCATED A LONG DISTANCE FROM THE BREAKER

of years to supply one breaker with coal, sometimes making use of outside haulage approximating a mile. Some of the improvements that this company has inaugurated to attain this end are interesting, as may be understood from the headframe shown in Fig. 1. The haul from the shaft to the breaker in this case is approximately ¼ mi. To secure a good grade between the two, the headframe was made about 100 ft. high to the sheave wheels and about 50 ft. high to the landing, shown in Fig. 2.

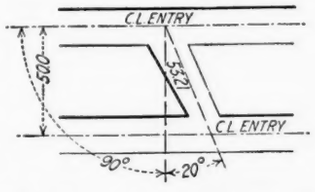
Walks are provided about the headframe at the landing, but to prevent any person or animal falling down the shaft, the openings are closed with stout grates. The cage when ascending lifts its grate and on descending lowers it into place. This method of closing the openings was considered safer than to use gates which boys could climb over when the mine was idle. A person, to reach the shaft opening at the surface, would be obliged to climb a high iron gate or to climb on the foundation around the collar and then over an iron fence. Someone is always at the shaft collar to keep watch, but not at the landing 50 ft. above. From an examination of Fig. 1, it will be noticed that the engine and fanhouse are modern in every particular. This is in strong contrast to the earlier types of construction at anthracite mines.

A Convenient Table for the Mine Transitman

SYNOPSIS—The accompanying table, made up in blueprints and pasted in the back of mine-survey notebooks, will save annoying delays and eliminate the possibility of errors so liable to occur in making underground computations.

Engineers and transitmen are frequently required to give points in a crosscut off the heading in order to drive back to meet the parallel heading, which for some reason has fallen behind. And very often when attempting to put in the "sights" in the crosscut it is found impossible to turn off the heading at a right angle. Therefore, it is necessary to make a calculation in order to maintain the desired distance, center to center of heading and the parallel. All who have made calculations in a mine realize how annoying and unsatisfactory it is.

In order to eliminate these I have prepared a table on tracing cloth from which I make blueprints, and these prints I paste in the back of all mine notebooks. The table is for every degree from 1 to 20 inclusive, 25, 30, 35, 40 and 45 deg., and for distances of 30, 40, 50, 60, 70, 75, 80, 120 and 150 ft. It has been found in actual practice that these figures are sufficient to meet all practical purposes. For an explanation of the use of the table, let us assume we are to put in sights for a parallel where a distance of 50 ft. is required between heading and parallel, as shown on the accompanying sketch. The crosscut was driven in such a direction that a sight of 20 deg. off a perpendicular line between the two entries was necessary. Referring to the column on the extreme left of the table, locate the 20 deg. and follow along the line to the intersection of the column headed 50 ft. at the top, and the distance is found to be 53.21 ft. This is the distance required at which to place the "sights."



The table may also be used when headings are on a pitch and vertical angles are necessary. For instance, let it be assumed we have a required distance on a pitch heading of 120 ft., at which point another heading is to be turned off. By trying out we find it necessary to measure on a 10 deg. vertical angle. Referring to the table, as in the previous case, in the 10-deg. line under the 120-ft. column we find the required distance to be 121.85 ft.

If a distance be required which is not given in the table, say a distance of 110 ft. for an angle of 10 deg., this may be obtained by using the sum of 50 ft. and 60 ft., which gives 50.77 plus 60.93, or 111.70 ft. Should the distance desired be 125 ft. and the angle 10 deg., we can use a combination of one-half of 50 plus 100, which will be:

$$\frac{50.77}{2} + 101.54 = 126.93\ ft.$$

The table will prove of value, and all transitmen will find it well worth their time to paste a copy in their mine notebooks.

TABLE OF DISTANCES TO MAINTAIN CENTER LINES WHERE ANGLES (OTHER THAN 90°) ARE REQUIRED

Angle of Variation from the Vertical	0°	30	40	50	60	70	75	80	90	100	120	150
	1°	30.00	40.01	50.01	60.01	70.01	75.01	80.01	90.01	100.02	120.02	150.02
	2°	30.02	40.02	50.03	60.04	70.04	75.05	80.05	90.05	100.06	120.07	150.09
	3°	30.04	40.05	50.07	60.08	70.10	75.10	80.11	90.12	100.14	120.16	150.21
	4°	30.07	40.10	50.12	60.15	70.17	75.18	80.20	90.22	100.24	120.29	150.36
	5°	30.11	40.15	50.19	60.23	70.27	75.29	80.30	90.34	100.38	120.46	150.57
	6°	30.16	40.22	50.27	60.33	70.38	75.41	80.44	90.49	100.55	120.66	150.82
	7°	30.23	40.30	50.37	60.45	70.52	75.56	80.60	90.67	100.76	120.90	151.13
	8°	30.30	40.39	50.49	60.59	70.69	75.74	80.79	90.89	100.98	121.18	151.47
	9°	30.37	40.49	50.63	60.75	70.85	75.93	81.00	91.12	101.25	121.50	151.87
	10°	30.47	40.62	50.77	60.93	71.08	76.16	81.24	91.39	101.54	121.85	152.32
	11°	30.56	40.75	50.94	61.12	71.31	76.41	81.50	91.69	101.87	122.24	152.81
	12°	30.67	40.90	51.12	61.34	71.56	76.67	81.78	92.01	102.24	122.68	153.35
	13°	30.79	41.05	51.31	61.58	71.84	76.97	82.10	92.37	102.63	123.16	153.94
	14°	30.92	41.23	51.54	61.84	72.14	77.30	82.45	92.75	103.06	123.67	154.60
	15°	31.06	41.41	51.77	62.12	72.47	77.65	82.82	93.18	103.53	124.23	155.30
	16°	31.21	41.61	52.01	62.42	72.82	78.02	83.22	93.63	104.03	124.84	156.04
	17°	31.37	41.83	52.28	62.74	73.20	78.43	83.66	94.11	104.57	125.48	156.85
	18°	31.54	42.06	52.57	63.08	73.60	78.86	84.12	94.63	105.14	126.17	157.72
	19°	31.73	42.31	52.88	63.46	74.03	79.32	84.61	95.19	105.76	126.92	158.64
	20°	31.93	42.57	53.21	63.85	74.49	79.81	85.13	95.78	106.42	127.70	159.63
	25°	33.10	44.13	55.17	66.20	77.23	82.75	88.27	99.30	110.34	132.40	165.51
	30°	34.64	46.19	57.74	69.28	80.83	86.60	92.37	103.92	115.47	138.57	173.21
	35°	36.62	48.83	61.04	73.25	85.45	91.56	97.66	109.87	122.07	146.50	183.11
	40°	39.16	52.22	65.27	78.33	91.38	97.90	104.43	117.48	130.54	156.65	195.81
	45°	42.43	56.57	70.71	84.85	99.00	106.07	113.14	127.29	141.42	169.70	212.14

The Chesapeake & Ohio Car Allotment Methods

The Chesapeake & Ohio Ry. Allotment Commission, under the direction of James W. Heron, its chairman, seems to have been peculiarly fortunate in escaping criticism, which obviously indicates a successful administrator at its head, and therefore an account of its methods is of interest. The commission was organized by the late Mr. Doyle, then general manager of the C. & O. Ry., in July, 1906, at which time the present chairman joined it, and later became its head. Mr. Heron has been ably assisted for five years by David R. Phillips, formerly a mine manager and a West Virginia state mine inspector. The third member, J. F. Healy, who recently joined the commission, was formerly a mine manager.

When the commission was first initiated, new mines of all kinds were allowed a full supply of cars for three months, or until such time as they had reached an output of 150 tons per day. This arrangement proving unsatisfactory, it was changed, and a six months' full car supply was allowed a drift mine, nine months a slope mine and one year a shaft mine. Upon the termination of this development period, the commission makes a careful examination of the mine equipment, inside and outside, so as to determine its actual loading capacity.

The examination includes the miners as the fundamental factor, the coal seam, roof, bottom, grades, liability of encountering explosive gas or dust, and troublesome amounts of water, the tracks, sidetracks, working places, ventilation, mine cars, cutting machines, locomotives, mules, horses and pumps. The haulage system is given special consideration, and a careful study is made of the time required to hoist a trip and the quantity of coal handled, whether in cars or on conveyor or chutes.

On the outside the mine tracks for the loads and empties are examined as to their efficiency and capacity, the type of dump, the screens, the number of loading tracks under tipple and their convenience as to grades and their capacity.

With this information carefully tabulated the commission is able to estimate the probable actual capacity of the mine and fix its proper allotment, to which 10 per cent. is added for expansion. After a mine has been allotted it is visited frequently by the commission, either as a matter of routine or by request, and any change in any of the allotment factors noted. If these changes are favorable the allotment is increased; if they are adverse, they are carefully investigated, and great care is taken to avoid a hasty or radical decrease.

All the allotments are carefully scrutinized at the end of each month and adjusted to suit the prevailing conditions, effective the first of the following month.

This makes it impracticable for any mine to remain out of adjustment any material length of time.

Of course, just as the capacity of the miners to load coal is the fundamental basis of the output of the mine, so the honesty and intelligence of the operators in making full and accurate reports form the real basis of proper adjustment, it being manifestly impracticable for even many times three men to make a proper physical determination of over 300 mines monthly. These reports include a statement of the number of tons loaded each day the mine is operated, the amount of equipment received in time for loading and remaining empty at the end of the shift, the number of loaders and the number of hours worked.

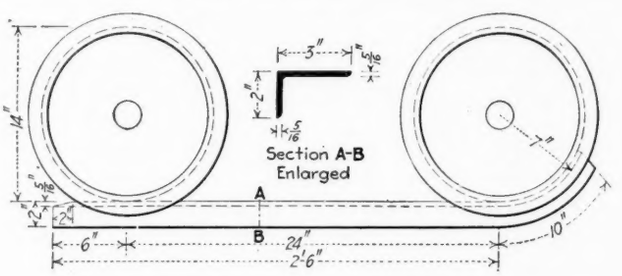
These statements are gathered during the month, and from them is computed the capacity of the mines. In addition to these reports the commission can refer to daily loading and empty reports furnished the railroad by the operators.

Mine-Car Slippers

By F. J. Immler*

In the accompanying photograph and drawing is shown a simple and money-saving device designed to take the place of brakes and sprags for holding mine cars on steep grades. The idea is not new, but as there are many *Coal Age* readers who have not seen it I present it for their benefit.

The slipper, or shoe, is simple in construction, being merely a piece of angle iron bent up at one end, like the horn of a dump, to conform to the circumference



DETAIL OF THE SLIPPERS

of the wheel. In use it is placed on the rail and the car allowed to run up on it, the friction between the rail and the slipper acting as a powerful braking agent.

The slipper shown is made of a piece of 3x2x$\frac{5}{16}$-in. angle iron 40 in. long, and is used with cars having a 24-in. wheelbase and 14-in. wheels. The gross weight of each car is about 4,000 lb. To make the slipper, the angle iron is heated, clamped to a car-wheel and hammered to shape. The straight end, as shown in sketch, is chamfered to facilitate the car-wheel's running up onto it. The slippers are made in rights and lefts.

At first sight it would appear that the slippers are heavy to handle and hard to place, but they weigh only about 15 lb. each and the trip rider can easily take care of four of them. With a little practice he can place them without getting off the cars and without having the trip slow down.

One slipper holds as many cars as do from six to eight sprags, and they do not cause flat wheels, as do sprags.

When this system of breaking is used, besides eliminating the nuisance of an occasional flat wheel, the slipper saves the expense incurred in putting brakes on each car and of keeping them in repair. When it is considered that the total cost of each slipper is not over 50c., the great saving is obvious.

Slippers are not suitable for mule haulage unless for a long grade, as with mules the cars have to be backed off the slippers by hand.

A point to note is that the slippers should only be applied on one side of the cars, as two slippers to the car would unduly spread the track gage.

*Chief engineer, Wind Rock Coal and Coke Co., Windrock, Tenn.

The Labor Situation

Anthracite Wage Conference

Shortly before two o'clock Sunday morning, Apr. 30, the subcommittee of anthracite operators and miners announced from their meeting room in the Union League Club, New York City, that they had arrived at a conclusion of their conferences and that they had "reached a tentative agreement that is satisfactory to them." That is as far as the official statement went; but it was learned that the agreement provided for a formal recognition of the United Mine Workers of America, an increase of 7 per cent. for contract miners, an 8-hr. day for day laborers with a 3 per cent. increase in their pay, giving them an advance of about 15.9 per cent. per hr., and a readjustment of the work of engineers with an increase of 7 per cent. in pay. The new agreement also provides that no contract can be made for machine mining for less than day rates, and contains an overtime provision. It is also agreed that the work of the Anthracite Conciliation Board shall be more promptly performed.

No Check Off, Closed Shop or Long Contract

The operators did not grant the closed shop or the check-off which were so strenuously fought for by the miners' representatives. They also refused the 2-yr. contract demanded by the miners, it being provided in the new agreement that it run for four years. This is a victory for the merchants of the coal regions also. They sent several letters to the committee asking that the contract be for the longer period.

It is provided that there be no change in the present system of handling powder and mine supplies, but it is understood that the operators will not charge more than a fair profit. The formal recognition of the miners' union means that the operators will permit Mr. White and the officers of Districts Nos. 1, 7 and 9 to sign the agreement.

The miners' representatives said they had obtained the fullest concessions possible. No comment could be obtained from the operators on the subcommittee and they left the city early Sunday morning.

This is a brief summary of the most important event of the conference, but it is necessary to describe the previous negotiations from the point at which they were left in last week's issue.

When the subcommittee adjourned on Tuesday, Apr. 25, announcement was made that no agreement could be reached and that a meeting of the full committee of operators and miners would be held on Thursday, Apr. 27, to receive the report.

Contract Is Referred Again to Subcommittee

This meeting was held in the Engineering Building, in West 39th St., and speakers on both sides expressed the hope that a strike would be averted. Mr. White said a strike in the anthracite region would be a public calamity. Brief remarks were also made by John Dempsey, president of District No. 1, following which several of the operators' representatives spoke. After a short conference held by the operators and the miners, in separate rooms, S. D. Warriner made a motion that the demands be referred back to the subcommittee for further consideration. This was seconded by Mr. Dempsey for the miners and adopted. It was understood that the subcommittee was to arrive at a "satisfactory" agreement.

The subcommittee resumed its sessions on Friday, Apr. 28, in the Union League Club, and reports had it that an agreement was being reached. At the end of the afternoon session it was announced that the committee members had agreed that whatever contract was finally made it would be retroactive from Apr. 1, 1916. A night session was held, but no further progress was announced.

Tridistrict Committee Goes Home and Returns

During the day the members of the Tridistrict Scale Committee of the miners were sent to their homes to prepare for the convention to be held in Pottsville on May 2, at which the report of the committee was to be made.

The session on Saturday, Apr. 29, began at 10 a.m. and continued until nearly 2 a.m. the next morning, with but a brief adjournment for dinner. Early in the afternoon it was announced that a "tentative agreement" had been arranged and that telegrams had been sent to the members of the miners' scale committee, who had returned to their homes on Friday, to be back in the city early Monday to take action on the agreement.

Nothing more was heard of the proceedings until the members left the Union League Club at the conclusion of their long session.

The Tridistrict Scale Committee met at the Hotel Continental at 10 a.m. Monday, May 1, and after a session that did not adjourn until after 3 p.m. it was announced that the tentative agreement had been unanimously approved.

Protocol as Accepted by Scale Committee

The full text of that protocol follows:

This agreement made this ——— day of ———, 1916, between Districts 1, 7 and 9, representing the anthracite mine workers' organization, parties of the first part, and the anthracite operators, parties of the second part, covering wages and conditions of employment in the anthracite region of Pennsylvania, witnesseth that:

The terms and provisions of the award of the Anthracite Coal Strike Commission and any subsequent agreement made in modification thereof and supplemental thereto are hereby continued for a further period of 4 yr. ending Mar. 31, 1920, except in the following particulars, to wit:

First: (a) The contract rates at each colliery shall be increased 7 per cent. over and above the contract rates at each colliery, effective in April, 1912, as established by the agreement of May 20, 1912.

(b) The working day established by the Anthracite Coal Strike Commission shall be changed from 9 to 8 hr. All employees paid by the day or hour and coming within the classification of company men, except as hereinafter more specifically provided, shall be paid for a day of 8 hr. the rate established under the agreement of May 20, 1912, for a day of 9 hr., subject to an increase of 3 per cent.

(c) All company men working on the basis of an 8-hr. day prior to Apr. 1, 1916, shall receive an increase of 7 per cent. over and above the daily or hourly rates established for their respective occupations by the agreement of May 20, 1912; except that hoisting engineers, who were granted an 8-hr. day in March, 1912, shall receive an increase of 3 per cent. over and above the rates established by the agreement of May 20, 1912; it being understood, however, that where three full shifts were substituted for two shifts in March, 1912, the rate of the three hoisting engineers shall be the same and the shifts shall alternate in the manner customary where continuous employment is required.

(d) All hoisting engineers working on a 9-hr. basis prior to Apr. 1, 1916, and whose duties require that they should continue to work 9 hr. per day, shall receive an increase of 7 per cent. over and above the 9-hr. rate established by the agreement of May 20, 1912.

(e) All company men working on a daily basis in excess of 9 hr. per day or on a monthly basis prior to Apr. 1, 1916, shall continue to work on said basis, and their wage, whether paid hourly, daily or monthly, shall be increased 7 per cent. over and above the rates established for their respective occupations by the agreement of May 20, 1912.

Right To Install Mining Machines Recognized

Second: Conditions having arisen in a portion of the anthracite region necessitating the use of mining machines, the right of the operator to use such machines shall be unquestioned and the method employed shall be at the option of the operator. Where work is done by mining machines, the following shall govern as a basis of payment to the several classes of labor employed in the undercutting, mining and loading of coal:

(a) When machine mining is done on a day basis, the rates paid shall not be less than the established colliery machine rates paid to the several classes of labor employed Apr. 1, 1916; provided that in no case shall the rate for a machine miner be less than $3.30 per day; for machine runner $2.70 per day; for machine miner's laborer, $2.34 per day; and for machine runner's helper, $2.34 per day, it being understood that these rates are agreed to as covering a new requirement and are applicable only to machine mining, subject nevertheless to 3 per cent. advance under the terms of this agreement.

Machine Mining Men Assured of a Fair Wage

(b) Where machine mining contracts cover the mining of a vein or section of a vein not heretofore mined, the contract rates shall be such as to enable the men employed in mining work to earn, on the average of all employed in each occupation, a daily wage not less than the rate established for said occupation in paragraph (a). Where mining machines replace contract miners cutting coal from the solid, the average daily earnings of the contract machine miners shall not be less than the average normal earnings of such contract miners in the territory where the mining machines are introduced and where the same vein conditions exist; provided that where the average normal earnings of the contract miners are shown to be less than the day rate established in paragraph (a) the machine contract rates shall be so adjusted as to enable the machine miner, on an average, to earn a daily wage of not less than the day rate established in paragraph (a).

(c) The operator shall be assured of the full coöperation of the machine miner in the development and maintenance of efficient operation, and the day's earnings shall be based on a workday of 8 hr. at the face as now provided in Section 3 hereof.

Will Not Reckon 8-Hr. Day from Bank to Bank

Third: An 8-hr. day means 8 hr. of actual work for all classes of labor, at the usual working place, exclusive of noontime, for 6 days per week, if the operator desires to work his mines to that extent, excepting only legal holidays. The time required in going to and coming from the place of employment in or about the mine shall not include any part of the day's labor. Drivers shall take their mules from the stables to the usual working place before starting time and shall return them to the stables after quitting time, compensation for such services being included in the day rates established for this class of labor. If, because of breakdowns, repairs or the requirements of transportation, or other causes essential to efficient operation, it is found necessary to extend the normal work day of any employee or any class of employees, the operator may do so, at his option, paying for overtime a proportional rate per hour as determined from the rates established under Section 1 hereof.

All Grievances Must Be Settled in 60 Days

Fourth: All grievances referred to the Board of Conciliation shall be heard and a decision rendered within 60 days from the date of reference to the board, provided that said period may be extended for such time as may be mutually agreed upon by the operator's representative and the mine-worker's representative in the district in which said grievance originates. If no decision is reached within 60 days after reference, or within the extension period thereafter, the board shall submit the case forthwith to the umpire for final decision as provided in the award of the Anthracite Coal Strike Commission.

Fifth: The present prices of powder and miners' supplies as established at the several collieries in the region shall be continued without change throughout the term of this agreement.

Sixth: Under paragraph (d) of the agreement of May 20, 1912, the duty of the Grievance Committee shall be confined solely to the adjustment of disputes in cases where the foreman and employees have been unable to agree, and in the discharge of this duty they shall strictly comply with the provisions of said paragraph.

Under paragraph (f) of the agreement of May 20, 1912, the Grievance Committee is given the sole authority of joining with the company officials in recording the rate existent Apr. 1, 1902, as well as the rates established under the agreement of May 20, 1912.

Seventh: The Board of Conciliation is empowered to hear complaints relating to day rates appearing on colliery rate sheets as effective Apr. 1, 1912, but which may be claimed to be obsolete of that date on account of being supplanted by other rates. The Board of Conciliation may at its discretion, in case the rates are shown to have been manifestly obsolete, order such rates erased.

Agree Not To Seek Nullifying Legislation

Eighth: Neither party to this agreement shall initiate or encourage legislation that would in any manner affect the obligations of this contract or impair any of its provisions.

If this agreement is adopted by the Pottsville convention it will be signed by the members of the subcommittee of operators' representatives and miners' representatives, the latter signing "on behalf of the Anthracite Mine Workers Organization," the names appearing on the agreement in the following order:

On the left-hand side the four members of the subscale committee shall sign. On the right, the presidents of districts Nos. 1, 7 and 9 shall set their signatures in the order named "on behalf of the Anthracite Mine Workers' Organization."

After them, still on the right side, the "President of the United Mine Workers of America, representing the Anthracite Mine Workers' Organization," shall append his name. Below these signatures shall appear the attesting signatures of the chairman and secretary, on the left and right side respectively.

All Legal But No Church Holidays To Be Kept

The last two paragraphs represent the sense of the wording of the agreement and not its actual form.

It should be noted that the miners practically agree to work all days but legal holidays. The custom has been to observe all the important church festivals, not so much for religious reasons as because of their social character. As there are both Greek and Roman Catholics employed, and as their calendars were different, the number of church holidays has long been considered a burden on operation too grievous to be borne.

How the Increased Expense Must Be Met

No formal statement was given out by the operators, but it was said that the addition to the payrolls of the companies would amount to between $10,000,000 and $12,000,000 annually. It is also commonly understood that this extra cost will have to come from an advance in the selling price of the domestic sizes of coal. No increase will be made in the price of the steam sizes. A copy of the agreement, it was said, was in the hands of each of the anthracite operators, and statisticians were engaged in working out the additional cost of production. No time was set for announcing the new schedule of coal prices.

There has been some opposition in the Pottsville convention to the adoption of the agreement, but it is believed that President White will be able to secure a favorable vote. The miners in the region expected a "closed shop," and it is thought that they may object to the agreement because this demand was not granted. Their leaders were convinced that this demand could not have been won without a long fight. They fully realize also that while shortened hours and higher wages are not unpopular battlecries, "closed shop" is a slogan which is not acceptable to the public. It establishes an organization immovably on the necks of the miners. At present the union is well advised, but who can prejudge the future or feel sure that it will always have leaders as sane and followers as enthusiastic?

J. P. White Approves Compact

Before leaving for Pottsville, President White gave out the following statement, unequivocally approving the protocol:

The agreement entered into between the anthracite operators and miners marks the greatest single advance won by organized labor in this year of victories. The money value of the increase is at least $10,000,000 a year. More than 110,000 men have their working time reduced from 9 to 8 hr. and the shorter workday is established for all time in the anthracite field. Other important advantages, such as quicker settlement of disputes and grievances, have been won for all the 176,000 miners in the anthracite region.

The miners have given the country a striking demonstration that the just demands of wage earners for improved wages and conditions can be won without strife when the men act together through a strong and responsible organization. The United Mine Workers of America is now recognized as being such an organization by this group of financial interests, which only a few years ago treated it with scant respect.

If it had not been for the existence of the union, the anthracite-coal district, with its 2,000,000 inhabitants, would have been thrown into bitter turmoil, and the miners would have endured suffering and hardship out of all proportion to the advantages won. The normal activities of the entire district would have been paralyzed and intense bitterness would have been created, all to no better purpose than a final settlement less favorable than that which the men have won through the union without stopping work for a day.

This catastrophe has been averted because the anthracite coal operators knew and respected the power of the miners' organization and the overwhelming force of public opinion that stood behind it in urging its demands.

Industrial Workers of the World

The organizers of the Industrial Workers of the World continue their agitation around Wilkes-Barre. It became necessary to call out the state police to protect the union miners at the Butler colliery of the Hillside Coal and Iron Co. and at the Boston settlement near Yatesville. The Industrial Workers of the World's agents stopped men on their way to work and urged them to go on strike.

Refusal and repetitions of the request resulted in a fight between the mine workers and the I. W. W. followers, and a call was sent for the state police, who restored order and arrested Tony Policca and Joe Posco, both of Dupont, an I. W. W. agitation center. Troopers on duty have orders to break up all gatherings and prevent disorder.

On Apr. 25, 35 members of the I. W. W. were arrested for attempting to stop men from going to work at the Fernwood slope of the Butler colliery. The men were arraigned before Alderman Thomas Loftus at the Pittston City Hall and 10 men were sentenced to pay a fine of $5 and costs or to serve 15 days in the county jail. All the rest were fined $15 and costs. As most of the men were unable to pay, they were taken in charge by the sheriff.

According to testimony at the trial, a policeman was fired at, a man was threatened to death if he went to work and another miner was so frightened by a display of clubs that he returned home. One man who was arrested was found with a stiletto in his clothes. Several clubs and a few knives were found by state troopers along the road leading to the mines. Most of the men are Italians. Tony Rose and Regi Natuce, contractors, engage the miners at Fernwood and they claim that they pay them $2.75 a day. The chief complaint of the I. W. W. men was that this form of contract was unfair.

West Virginia Split Is Ended

The split in West Virginia over the election of the officers in district No. 17 seems about to be ended everywhere by a reconciliation. The leaders of the union had been accused of dishonesty in the conduct of the elections and district No. 30 was formed, which was not recognized by the international authorities or the Indianapolis convention. At Boomer an injunction followed, in which the union tried to prevent the operating firms from paying the checkoff to the insurgent leaders.

As a result of this and other irritations the miners formed another body separate from the United Mine Workers Union and the new organization signed with some of the operators a contract to last for three years. This document promised increases equal to those that are paid elsewhere.

Mother Jones Binds Up the Union Wounds

Recently the United Mine Workers of America has been very busy and has taken every means to heal the old breach. Mother Jones, who during the troublous times of the Cabin Creek strike had largely built up the union in the section thus revolting, was sent into the region to renew harmony. If the miners in Indiana resented the officers of the union hiding behind a woman's skirts and thought it best not to let her address them at Indianapolis, the union officials had no such scruples when they sought to bring the Cabin Creek men back into the fold.

An agreement has been made with the operators in the region and a referendum has been taken, the new contract being unanimously approved in some places, though the men of Dorothy were almost of one mind in opposing any such surrender of the union of their choice.

Miners Vote Nearly 3 to 1 for New Contract

It is reported that Acme gave 64 votes for and none against; Colcord 40 for, none against; Dorothy 9 for, 67 against: Decota 69 for, 9 against; Giles 39 for, none against; High Coal 37 for, 13 against; Jarrolds Valley 44 for, 7 against; Kayford 1, 27 for. 46 against; Kayford 2, 30 for, 54 against; Leewood 30 for, 8 against; Ronda 54 for, 4 against; Sharon 77½ for, 1 against; Wevaco 1, 28 for, 19 against; Wevaco 2, 46 for, 7 against; Whitesville 35 for, 6 against; Republic 39 for, 9 against. It is also said that the agreement was ratified by a total vote of 665½ for and 250 against, though the figures just quoted total to 668½ for and 250 votes against the agreement.

The new contract between the operators and miners follows closely the agreement made with the West Virginia Mine Workers Union; but instead of the local organization being mentioned in every case it is the United Mine Workers of America which appears in its place. The miners receive 5 per cent. increase for day labor and from 6 to 11 per cent. increase in the mining rate. The contract runs for three years and probably, therefore, will outlive all the other contracts being made at this time.

The mines at Boomer and Longacre in the Upper Kanawha section are still idle, but it is expected that there will be a general resumption soon. The Boomer miners have been strongly opposed to the United Mine Workers of America.

Ohio Disputes Near Settlement

After a conference lasting about 10 days, representatives of operators and miners in the Hocking Valley district arrived on Apr. 25 at an agreement on working conditions. No serious trouble was encountered in the writing of a protocol and work was started at once at many of the mines in the district. The operators believe that they secured good conditions and are of the opinion that the alleged discrimination between the Hocking Valley and eastern Ohio is removed.

The operators obtained concessions along several lines which will enable them to furnish coal to their customers in better condition. One of the provisions makes the snubbing of coal compulsory and another prescribes rather drastic penalties for loading dirty coal.

Another important concession is that relating to strikes. Only two causes for such suspensions are conceded—defective scales and failure to pay at regular times without explanation. All other grievances are to be referred to the arbitration committee, and no strike is legal unless called by the state officers of the miners' organization.

The check-off is affirmed and will be continued for the two years which is the life of the agreement. Several sections in the contract regulate the width of rooms, the apportionment of cars and the cleaning up of slate. But these are similar to those prevailing in the previous wage agreement.

Pomeroy Bend and Eastern Ohio Make Progress

In the meantime the wage conference of operators and miners of the Pomeroy Bend district, held at Pomeroy, is progressing satisfactorily. At the end of last week many of the points had been settled and no serious differences appeared. It is believed that the working conditions will be arranged within a few days and mining is expected to be resumed early in May.

In the eastern Ohio district, for which a wage conference is being held at Cleveland, optimism reigns. Up to May 1, about 50 per cent. of the conditions had been amicably settled and no serious trouble is anticipated. The operators are insisting upon stringent regulations for cleaning coal and also on a rule forbidding unwarranted strikes. These provisions will probably be modeled after those contained in the Hocking Valley agreement, the two fields being competitive.

One of the side issues of the wage conferences in the eastern Ohio district was a strike of about 2,500 miners at 14 of the larger mines in the district. The trouble was over the division of the increase provided for in the scale. The officials of the union ordered the men back, but they refused to go. The trouble is not considered serious.

Difficulties in West Virginia

A correspondent in the New River field, West Virginia, writes that after men have been obtained from outside the state it is hard to hold them. He says:

The better the treatment the man is given and the more money he makes the sooner he collects his little stake and leaves the state. But where a miner is comfortably situated, has a nice house and good furniture and makes his abode a real home he becomes a better citizen, is more tractable and is not disposed to put his money into two suitcases and leave for other fields.

The present system of taxation has much to do with the miners leaving so soon. A man has no inducement to provide his wife and family with the many comforts which go to make up a nice home when he has to pay taxes on every article in his house.

An amusing but embarrassing incident came under my notice the other day. The assessor of the district went to a house to assess a man's household goods. There was an ornamental clock on the mantel given to the lady of the house by some relative probably over 20 years ago. It had not been running for that length of time and possibly never did run.

In fact, as a timepiece it was worthless, but it was kept because the owner had a sentimental interest in it. Yet though it really was not a tangible asset he had to pay taxes on his grandmother's clock, nevertheless. Surely someone will find some way by which taxes can be collected without driving away desirable citizens and crippling the works on which our state depends.

Hocking Valley Wage Scale

The preliminary scale for subdistrict 1 of district 6 of the United Mine Workers of America, covering the Hocking Valley field, has been prepared and printed. It is expected that this will serve as a basis for agreements in other districts. All the mines will probably resume within a few days except those of the Continental Coal Co., which is in the hands of the receiver, N. D. Monsaratt.

This agreement, by and between the respective duly authorized representatives of the coal operators and miners of the Hocking District of Ohio.

Witnesseth, That pursuant to the Interstate Agreement entered into at New York, Mar. 9, 1916, the following shall be the prices, rates of wages, rules and conditions to govern the production of coal in the Hocking District up to and including Mar. 31, 1918.

We, the members of the scale committee representing the operators and miners of the Hocking district, submit the following prices and conditions as the wage scale for said district for a period of two years, beginning Apr. 1, 1916, and ending Mar. 31, 1918.

PICK MINING

Run of mine	$0.6764
Entries, dry, per yard	2.6245
Breakthroughs in entries, per yard	2.6245
Breakthroughs in rooms, per yard	1.8196
Room turning, per room,	3.9780

INSIDE DAY LABOR

Tracklayers, bottom cagers, drivers, trip riders, snappers on gathering locomotives, water and machine haulers, timbermen, wiremen, motormen (minimum), per day	$2.98
Tracklayers' helpers and all unspecified day labor, per day	2.75
Trappers, where old men are employed	1.59
Trappers	1.40

Spike-team drivers 25c. per day extra.

MACHINE CUTTING

By Jeffrey-style machines, in room, per ton	$0.07400
By Jeffrey-style machines, in entry, per ton	0.10235
By punching machines in rooms, per ton	0.10840
By punching machines, in entries, per ton	0.12016

LOADING

In rooms, per ton	$0.40600
In rooms with hand drilling, per ton	0.42600
In entry, per ton	0.49945
In entry with hand drilling, per ton	0.51945
Breakthroughs in entry per ton—entry price	0.51945
Breakthroughs in rooms, with hand drilling	0.48900

DRILLING

By hand, per ton	$0.0200
By machine, per ton	0.0195

OUTSIDE DAY-WAGE SCALE

First blacksmith, per day	$3.27
Secand blacksmith and mine carpenters, per day	2.95
Blacksmith helpers, dumpers and trimmers, per day	2.75
Slack haulers, per day	2.28
Greasers and couplers, per day	1.64

When engineers and firemen are employed by the day, the minimum rate shall be $2.75 for 8 hr. work. This rule shall apply to coal washers, but shall not be held to be of force as regards such men as are employed at a monthly rate.

1. The 8-hr. day and the 48-hr. week are hereby reaffirmed and the following holidays are recognized: Sundays, New Year's Day, Washington's Birthday, Apr. 1, Decoration Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas, May 1, International Labor Day, and the general election day in November.

2. The 8-hr. day means eight hours work in the mine at usual working places for all classes of inside day labor. This shall be exclusive of the time required in reaching such working places in the morning and departing from same at night.

Drivers shall take their mules to and from the stables, and the time required for this purpose shall not include any part of the day's labor, their work beginning when they reach the change at which they receive empty cars, but in no case shall the driver's time be docked while he is waiting for such car at the point named.

Daymen Called to Mine Entitled to 2-Hr. Work

3. When the men go into the mine in the morning they shall be entitled to 2-hr. pay whether or not the mine works the full 2 hr. But after the first 2 hr. the men shall be paid for every hour thereafter by the hour for each hour's work or fractional part thereof. If for any reason the regular routine work cannot be furnished the men for a portion of the first 2 hr., the operators may furnish other than the regular labor for the unexpired time.

4. The operators shall keep a square turn. There shall be no free turns allowed to either rooms or entries. The entries shall be driven as fast as operators desire or conditions permit; but in no case shall entry miners be allowed more cars per week than room miners; and at least once each two weeks the turn shall be made uniform for the time previously worked.

If, however, the regular turn will not allow enough cars to drive the entries as fast as desired, the operators shall increase the number of miners in each entry, so that by giving to each the regular turn the entries shall be driven as fast as two miners could drive them with full work. If, however, the room men decline to take their places in the entries when requested to do so by the operators, then the entry men shall have free turns until the entries are driven the required length. Nothing in the foregoing shall prevent fast turns.

Miners Must Snub Coal Before They Shoot It

5. Both miners and operators recognizing the importance of getting clean and merchantable coal to insure the sale of the same, it is understood and agreed that the miners will produce their coal in such a way as not to increase the percentage of fine coal, either by carelessness or reckless shooting, and will load clean and merchantable coal free from impurities.

In order to secure the foregoing results it is agreed as follows:

(a) Before shooting all coal must be snubbed by the miner and fine coal and cuttings cleaned out from under the coal. Snubbing shall be not less than 10 in. above the cut, or at the mining slate where it is found, and 3 ft. under the coal, and as near from rib to rib as practicable. Snubbing must be done in a practical and workmanlike manner so as to keep the quality of the output uniform and produce the largest lump coal.

(b) The miners or loader shall not drill any hole on the solid of the rib, nor deeper than the under cut.

(c) Unless otherwise required by the operator, the fine coal and cuttings must not be loaded out separately, but must be loaded and distributed throughout the balance of the coal in order to keep the product of the mine uniform.

(d) Any miners or loader who is found breaking up and loading bone, soft coal or other impurities with his coal shall be laid off 5 days for the first offense and for the second offense he shall be discharged.

Provisions Giving Assurance of Clean Coal

6. The operator may designate one man at each mine, who shall be recognized as inspector, and whose duty it shall be to inspect the coal. The miners may also designate one man at each mine to inspect the cleaning of the coal and the weighing of the impurities.

Should a loader willfully, carelessly or otherwise fail to load clean, merchantable coal, the inspector shall estimate the impurities or cause them to be weighed, and if there shall be 100 lb. or less, and it is apparent that dirty coal has been loaded intentionally, then 10c. shall be deducted for the impurity.

For from 150 to 200 lb. of dirty coal 20c. shall be taken, and for from 250 to 500 lb., 30c.

For the third car of dirty coal from any one working place in any one day, or where 500 or more pounds of dirty coal is found in any one car, 50c. shall be checked off, and the man or men shall be suspended for one day, and if, upon investigation by the mine boss and committee, the man or men are found to have an average working place, he or they shall be suspended two days. But should the place be found to be below the average, then the turn of the loader shall be made up for the days during which he has been suspended and the 50c. that has been held shall be refunded.

Whenever the provisions of this contract are not observed, the operator has the right to close down the mine until the miners will observe the contract to produce clean, merchantable coal. It is understood that the operators have a right to clean the coal before weighing.

The moneys checked off shall be placed in the burial fund and shall not be returned and shall only be used by miners and operators for the purpose for which such fund was created.

7. Where clay veins, rolls in the bottom, or horsebacks exist, the price for removing them shall be determined between the loader and mine boss. If they fail to agree, the dispute shall be referred to the loader mine boss and the mine committee.

8. The company shall remove the slate from the working places of the miners; and if the company fails to do so after being notified, the miner shall be employed to remove such slate and be paid therefor at the price agreed upon between the mine boss and the miner, based on the price of inside day labor. This refers to the roof only, and not to bone coal.

9. All machines shall be fitted with a **front shoe not** exceeding 2½ in. in thickness, and the machine **men shall** be required to cut the coal level and close to the bottom. Under no circumstances shall the thickness of the bottom exceed 4 in., except in case of pots or other extreme variations. All machine men leaving more bottom than just prescribed must lift it or it shall be lifted at their expense.

Miner Need Not Lift Over 4 In. of Bottom Coal

Where the mine boss or superintendent orders that more than 4 in. be left the company shall take care of it; and where the bottom is sulphurous and unmarketable, the miner may call the attention of the mine boss to it and endeavor to arrive at an agreement for its removal or retention. If the mine boss and miner fail to reach an agreement as to compensation or otherwise, the matter shall be submitted to the superintendent and mine committee for adjustment.

In case sprags are left by a machine man, he shall be notified by the loader, and if he refuses to remove them the latter shall do so and be allowed 50c. for that work, the said 50c. to be deducted from the machine runner. When any machine runner leaves six or more sprags in any one pay, he shall be removed from the machine and his services shall be disposed of as deemed best by the general superintendent.

The company shall provide shields for covering the cutter head of the machine. The machine man shall be required to remove the bits from the chain on the cutter head, or place the shield over the cutter head, to make the machine safe when being moved. Any machine man failing to carry out this rule may be removed from the machine without question.

Regulations Which Compel Driving Wide Rooms

10. All rooms shall be 24 ft. wide or over; but where roof or surface conditions interfere they may be driven under 24 ft. wide and as narrow as 20 ft. in width without extra compensation.

Where it is necessary to make the rooms between 18 and 20 ft. wide, the price shall be 2c. per ton extra. Rooms less than 18 ft. in width shall be paid for at entry price, and where they are driven 30 ft. wide they shall have two tracks, if that arrangement is practicable.

The operators shall designate the width of all working places, and the work shall be paid for as if it were driven at the width thus ordered.

In working pillars or stumps with a cut 15 ft. wide the cutter and loader shall be paid at the "wide price." If 15 ft. or less with two tight ends entry price shall be paid. If 15 ft. or less with an open end, the cutter shall be paid entry price and the loader the "wide price."

11. Men other than drivers and trappers employed in gathering up coal along working roads and in cleaning track shall receive pay for such work at narrowwork prices per ton, with cutting added. Any such man found taking down or loading coal other than that already taken down or found along the track shall be discharged.

12. Pick miners shall pay one cent on the dollar for blacksmithing, but there shall be no charge under this head for machine runners and loaders.

13. When opening rooms in pick mines, if the length of the narrowwork preliminary to widening the room exceeds 18 ft., all excess above that figure shall be paid for at entry price.

Payment Made for Coal When Place Falls In

14. If the company insists on a machine man cutting any given place, it shall pay for all the coal lost if the place falls in. Coal so lost shall be paid for within 30 days.

15. Where the mine boss and miners fail to agree as to whether the working place is wet and entitles him to extra pay, it shall be referred to the committee and mine boss or superintendent, and if the place is adjudged wet, 2.562c. per ton additional shall be paid.

Ten cents per barrel shall be paid for bailing water. Sufficient oil barrels of the usual type shall be furnished to the miners to assist them in keeping their places dry. Should the management fail to provide empty barrels as required by the miners, then 2.562c. per ton extra shall be paid for wet places.

The company may work wet places or leave them unworked at its option. It is agreed and understood that the miner must first take up the matter with the mine boss for adjustment or he will not be entitled to the "wet price."

The Hocking Valley scale is too long to complete in this issue. The rest will appear next week.

Pittsburgh Coal Co. Resumes

At the conclusion of the conference held in the Hotel Continental, New York City, on Thursday, Apr. 27, between John P. White, international president of the United Mine Workers of America, and H. K. Fields, president of the Pittsburgh Coal Co., over the interpretation of what is known as the "McAlpin" agreement, it was announced that a satisfactory understanding had been reached and that the mine workers had been ordered back to work. As a result the strike is at an end. No one anticipated any other result, as the matters to be adjusted were not important.

The Roane Iron Co. and the Knox Mining Co. have granted an increase of 10 per cent. to their 800 men at Rockwood, Tenn., the advance to become effective at once. The Knox Mining Co. will pay 44c. per ton for 4-ft. coal and for thinner coal in proportion. In a number of individual cases the increase was over 10 per cent.

New Apparatus and Equipment

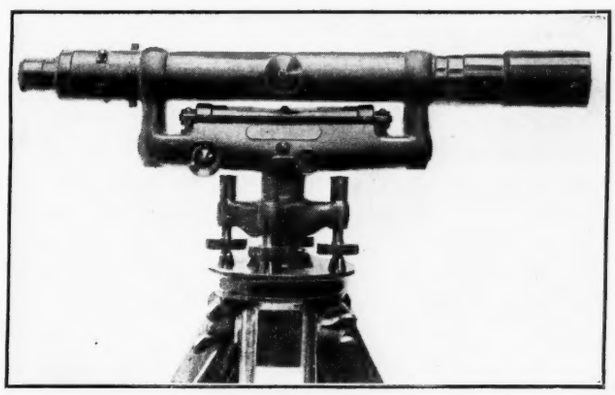
Monitor Transits and Levels

C. L. Berger & Sons, of 37 William St., Boston, Mass., have recently placed upon the market a new line of surveying instruments known as Monitor transits and levels. These instruments are strictly in line with modern thought and achievement. They possess strong lines, the outward forms being rounded, giving an assurance of strength without an unnecessary use of material. The outward appearance of the instruments are pleasing to both touch and eye, while they are of such a form as to shed water well. These instruments are well adapted to strenuous service, and externally are given a durable leather finish, which in a large degree protects them from the action of sun, rain, mine acids, grease and the like.

These instruments are particularly well adapted to use where a high degree of skill is necessary, such as the building of long bridges, dams, tunnels, highways, the surveying of mines and like uses. Permanency and endurance have been the prime objects sought in their design, and the instruments are consequently well adapted to the use of the engineer who strays far afield, thus getting out of reach of any source of instrument supply or repair.

In detail, the transit might be described as follows: All outer surfaces are rounded, giving great stiffness and water-shedding qualities. Only virgin ingot metals, properly alloyed so as to fit them for their particular use, are allowed to enter the construction of the instrument. All graduations are made on sterling silver by a superior dividing engine. The telescope is simple in construction and embodies superior optical qualities. The tripod head is of rigid construction, while the centers are long, strong and unyielding. The plate level is mounted low, with an independent guard, and is placed at 90 deg. from the line of sight of the telescope. This level does not cast shadows on the "B" vernier, which may be read as easily as the "A" vernier. The eyepiece cap is of large diameter, and provision is made for centering the instrument from a point above.

THE MONITOR TRANSIT AND VIEW OF ITS HORIZONTAL PLATE



THE MONITOR LEVEL

This instrument has a horizontal circle 5½ in. in diameter and a vertical arc of 5 in. The weight of the instrument is 13 lb., while the tripod weighs 9 to 9½ lb.

An auxiliary telescope, for reading horizontal angles inaccessible with the main telescope, may be attached to the top of the axis with a counterpoise below, the same as with other mine transits for underground work.

The Monitor level is of the dumpy type, with a telescope 14½ in. long, with an aperture of 1⅜ in. and a magnifying power of 30 diameters. The focusing slide is of unusual length, and is provided with a collapsible dust guard.

The eyepiece has a large, flat field of view, the spirit level being 6 in. long between centers of suspended arms. This instrument is provided with a clamp and tangent screw and weighs 9½ lb., while the tripod weighs about 9 lb. The supporting bar of this level is tubular, thus affording great rigidity with comparatively light weight.

The Denver Dreadnaught Drill

The Denver Rock Drill Manufacturing Co., Denver, Colo., is meeting with remarkable success in the new type of rock drill known as the Dreadnaught. This is a machine that, while rugged enough to be put to the most severe service, is sufficiently light in weight to be used as a one-man drill in sinking.

This drill may be used either mounted in a screw-feed shell, as in usual types, or with a flexible handle may be manipulated by hand. The change from one use to the other is extremely simple.

The drill uses hollow steel. It is constructed to deliver air and water, separately or simultaneously, under pressure to the bottom of the drill hole. When wet drilling is not required, the water equipment may be replaced by a "blowgun" that forces compressed air into the drill hole instead of water. When this is done, the compressed air for the hole is entirely independent of the driving air.

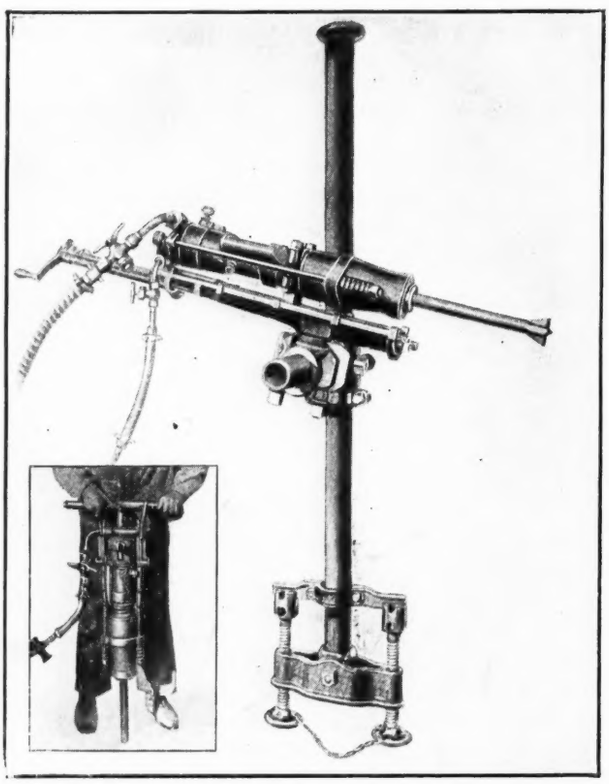
The machine is valveless and uses compressed air expansively. The hammer cannot strike either end of its cylinder even if the drill steel is not against the rock and full pressure of air is turned on. Rotation is accomplished by mechanism located entirely in the front head. The hammer is prevented from revolving in the cylinder by two keys, while rifles on the reduced front portion engage with the rifle nut, turning the latter on each stroke. Through pawls and plungers the chuck ratchet and the chuck sleeve are turned, positively and powerfully. The entire chuck end of the machine may be removed without taking the drill from its mounting.

If the machine should from any cause get out of line while drilling a hole, it will not fitcher, because of the positive rotation and the ability of cranking back without danger of injuring the drill. When the drill is used for down-holes, as in sinking, there is a decided advantage in permitting the machine to bodily churn up and down, with its drill steel, while full force of rotation is maintained, for this will effectually prevent clogging of the bit by rock chippings.

The Drill Is Comparatively Light

When this drill is used with the spring handle, it weighs 83 lb.; when mounted in its screw shell, it weighs 140 lb.

The chucks furnished with each machine will use 1⅛-in. and 1¼-in. steels. Because of the unique construction



THE DREADNAUGHT ROCK DRILL MOUNTED ON A COLUMN AND ALSO USED AS A HAND DRILL

of this machine, the drill proper may be quickly removed from the feed shell and slide by simply removing two bolts that clamp it in its yoke directly back of the front head. This drill has proved quite successful, both in drifting where the holes are horizontal and in sinking where they are vertical.

A Novel Fire Basket

The Morrow Manufacturing Co., of Wellston, Ohio, has recently obtained the patent for and put upon the market a novel fire basket designed for use in ventilating new and developing mines or for small operations where the ordinary so-called "furnace" is commonly employed for creating an air current.

Four cast-iron bases about 12 in. in height, in the top of which are cast 1-in. steel rods extending upward

THE FIRE BASKET BUILT UP ON ITS FOUR SUPPORTS

about 20 in., form corner supports for the grate and side bars. Two bearer-bar supports having holes cored in either end are slipped over the steel rods and rest upon the bases. The grate bars are then laid in place on the bearers and the side bars, which also have holes cored at the ends, are put on in the same manner, alternating first lengthwise then crosswise of the grate bars until the desired height is reached. This may of course be varied to suit local conditions, such as the height of the available space, the amount of coal which it is desired to charge at one time, etc.

The basket is thus substantially tied together, but may be easily taken down if desired. Being of a sectional nature, it may readily be transported to any point in the mine. The several pieces are light enough so that they may be carried by hand to mountain openings where no other means of transportation are available.

The grate and side bars are designed to give a large radiating surface, and the free passage of air from the mine prevents the side bars from overheating. Hot coals cannot roll off and set fire to adjacent timbering or the wooden stacks commonly used. The ashes may easily be removed through the side bars or raked from under the basket.

Tests have proved that this type of fire basket is more economical and satisfactory than the "furnace" commonly built up T-rails for grate bars and a rock or brick walls for supports.

In a test recently made it was found that 40 men in a comparatively new opening could be supplied with a lawful amount of air with a basket 36 in. square. Its convenience and low cost will doubtless be factors in bringing this new device into popular favor.

Editorials

A Compact Between Gentlemen

The agreement between the anthracite operators and miners may with reason be regarded with pleasure by both parties and the public. It is a triumph of sanity. The readiness of the operators to hear the miners' contentions, the judgment and patience with which the officials of the miners presented their case, the forbearance and common sense that kept the men at work the while, the fairness of the final outcome, the remarkable truth with which this time the press represented the issues, the comparative readiness with which the anthracite operators put their argument before the public and the establishment of a shorter laboring day mark this as an epoch in contract making and show us that there are possibilities of industrial adjustments without industrial strife.

There never was a moment of doubt that the miners were entitled to some increase in wage. They had seen advances all around them, and it was not merely jealous emulation that seized them. Workingmen have to pay the wages of other workingmen, and they cannot pay them the increased wage unless their own earnings are increased.

But the biggest triumph of all was the grant of a sane recognition—a recognition which does not coerce the workingman to belong to the union, which does not make the company the collector of union dues, but admits that the union has the right to speak for the men. The right is due to that organization, for it has always recognized the confederation of the employers. The union for a while wavered and was disposed to put regularity and solidarity above wages. But better counsels, the pressure of the anthracite operators and the opinion of the public prevailed.

The change will cost the consumer of prepared sizes between $9,000,000 and $12,000,000 and he will surely be willing to pay it. He is always declaring for justice; surely he himself is willing to be just. The difficulty might conceivably have been partly met by an increase in steam sizes, seeing that there has been or will be an advance in wages in practically all the bituminous coal-mining centers—though, by the way, nothing has been heard here from the Pocahontas region except that the United States Coal and Coke Co. has raised its men's wages liberally.

But the advance cannot be thrown proportionately on the steam sizes of coal, for some of the mine workers may get as much as 15.9 per cent. increased wages unless they arrange to reduce that increase by speeding their labor, which it is almost hopeless to expect that they will do, for they have been at no time vociferous in their premises, and in their practices they will probably be even less solicitous for the interest of the operators.

Such a reduction could and should be made, but it can hardly be expected that the day workers will make it, for they only get 3 per cent. increase in actual day wage where they demanded 20 per cent., and so they are not exactly enthusiastic. Hence the bulk of the rise has to be made on domestic sizes, and it is likely that it will all be so placed, because the stocks of the smaller coal are in normal markets kept moving only with great difficulty.

It is to be hoped that the public will meet the needed revision in prices with cheerfulness, seeing that it is the miners who are the recipients of their indulgence. As has been said, no long-established business which has reached a stable basis can meet wage rises without an increase of price, much less can it meet at the same time any growing difficulty in conducting its business.

If a railroad keeps its rates per ton-mile at an even level, we think it is doing well by the public. Hence it is to be hoped that the people do not expect coal to be hauled and hoisted for a lower rate per ton-mile year by year despite continued wage increments. Nor is increased haulage the only problem; more water to raise, higher depths from which to lift it, more galleries to keep in working order, more gas to be removed and more difficulty in ventilation, thinner and less clean veins to work, which involve higher wage scales even without adjustments such as that just concluded. All these add to the operators' difficulties.

Coal Age would like to see the mine operators make model wage adjustments as an example to the industrial world. In many ways the coal industry is worthy of imitation already, but contracts should be for longer periods and should contain a sliding scale to accommodate wages to cost of living. Then it would not be necessary to break up industrial peace every two years or even every four, but it would be possible to restrict the revision of the wage settlement so that there would be only one contract every ten years.

Our Deficient Merchant Marine

While our Government continues mulling along in its cumbersome, futile way endeavoring to enact measures that may provide the American people with shipping facilities commensurate with the size and importance of our country, golden opportunities for expansion are being irrevocably lost to our industries. Time and again in the past few months have American coal operators had almost unprecedented tonnages of new business offered them at exceptionally attractive figures which they have in most instances been compelled to decline because of the inadequate ocean transportation facilities. The announcement of a foreign inquiry involving 5,000,000 tons of coal appearing on page 757 of last week's issue again brings this question before us.

Striking evidence of the phenomenal advance in ocean freights on coal cargoes is clearly shown in the accompanying table giving the comparative rates for 1914 and 1916. The rates for 1914 are those published in *Coal Age* of Nov. 7 for that year, Vol. 6, p. 773, and the figures for 1916 appeared in the issue of Apr. 22. It

COMPARATIVE OCEAN FREIGHTS ON COAL TO FOREIGN PORTS

To	1916	1914	Increase	To	1916	1914	Increase
Havana	$4.75@5.00	$1.60@1.75	$3.15@3.25	Bermuda	$5.00@6.00	$2.25 about	$2.75 about
Cardenas or Sagua	6.25 about	2.15@2.25	4.10 about	Vera Cruz	7.00@8.00	1.80@2.00	5.20@6.00
Cienfuegos	5.50 about	1.90@2.00	3.60 about	Tampico	7.00@8.00	1.85@2.00	5.15@6.00
Port au Spain, Trinidad	7.25@7.50	2.25 about	5.00 about	Rio Janeiro	19.00 about[4]	3.96@4.20	15.04 about
St. Lucia	7.25@7.50	2.15@2.25	5.10@5.25	Santos*	19.00 about[4]	.....	.....
St. Thomas	6.75@7.00	2.00 about	4.75 about	Montevideo	21.60@22.20[1]	.....	.....
Barbados	7.25@7.50	2.25 about	5.00 about	Buenos Aires or La Plata	21.60@22.20[1]	3.84@3.96	17.76@18.24
Kingston	6.25 about	2.00@2.25[7]	4.25 about	Rosario	22.80 about[2]	.....	.....
Curacao	6.75@7.00[3]	1.75@1.85	5.00@5.15	West Coast of Italy	33.60@36.00	4.32@4.80[8]	18.48 about
Santiago	6.00@6.25[6]	2.20@2.35	3.80@3.90	Barcelona[5]	30.00@31.20	.....	.....
Guantanamo	6.00@6.25[6]	2.25@2.35	3.75@3.90	Valparaiso or Callao	17.00 about	4.32@4.80	12.68 about
Demerara	.....	3.00 about	.....	Marseille	32.40@34.80	.....	.....

* Consignees paying dockage dues. ** Spanish dues for account of cargo.
[1] 500 tons discharge. [2] 400 tons discharge. [3] And p.c. [4] Net, 1,000 tons discharge. [5] Or other good Spanish port. [6] 350 tons discharge.
[7] Small boats to Kingston $2.20@2.40. [8] Mediterranean.

will be noticed in this table that rates to foreign ports, both European and South American, have been jumped up as much as 400 per cent., while those to ports that are nearer have been increased from 100 to 200 per cent. Obviously it is a problem to negotiate coal business under such extraordinary conditions. That the situation is equally serious in British shipping circles, as shown by the following table compiled by *Shipping Illustrated,* may perhaps be some compensation:

To	Highest January, 1916	Highest February, 1916	Mar. 18, 1916	Average, 1914
Bordeaux	$8.68	$10.03	$12.93	$1.36
Genoa	19.46	20.67	23.10	2.15
Marseille	17.37	17.75	24.11	2.10
Nantes	8.29	8.96	11.58	1.25
Rouen	5.83	6.07	8.26	1.37
St. Nazaire	8.10	8.96	11.58	1.25

Rates are per gross ton from Cardiff, Wales, to points designated.

On the other hand, the fuel supply has become a serious proposition at many points which have in the past relied upon Great Britain. The situation has even on occasions attained to such acute proportions that consumers have been forced to buy at any figure, with the result that our exports have shown a persistent increase in spite of the extraordinary conditions prevailing as regards freights. The increase, however, is only sufficient to be exasperating when one considers to what proportions it might have attained. It would seem as if many of the misdirected "trust-busting efforts in this country might have been replaced with advantage by a campaign to provide us with adequate shipping at this crucial period.

Readiness To Sacrifice Self in Mine-Rescue Work

There is something so ennobling in the self-sacrifice which accompanies mine disasters that sometimes we wonder that such distressing misfortunes have not been advocated by a certain school of militant philosophers—as war has too often been—for the opportunities it affords for bringing to the front the nobler instincts. The argument is as reasonable in the one case as the other, though the position taken is in both instances utterly untenable.

Nevertheless at every mine disaster we are permitted to rejoice in the evidences of the humanity of man at times of man's utmost need. A pity indeed it is that most of mankind are unselfish only in the presence of death, but when free from its presence are the veriest shirkers of duty. The social obligation too often absolutely fails to move mankind, though their duty is incumbent on men in peace as in war, under normal conditions as under disaster, in life as in death.

And because the daily round of duties fails to move us is the reason why we are so indifferent about our safety work and yet willing to throw ourselves wholly away and give our all when a great emergency arises. Then only are we really servants of our social obligation. A lesson like that given at the mines of the Jefferson & Clearfield Coal and Iron Co., at Ernest, is almost all thrown away if we forget that the self-sacrifice of the moment forms a precedent, not for action in disaster alone, but for service during life.

It may be well to recall the facts. A severe explosion occurred on Feb. 11. After the disaster it was learned that Mine Foreman James W. Balls and Fireboss Carl Strandquist were both where they could easily have saved themselves. Only a short step separated them from safety. Balls' cap and lamp were discovered where they had been blown from his head by the force of the explosion. So the point of comparative safety he had left to take up the work of rescue was made clearly evident.

But disregarding their self-interest, Balls and Strandquist went back to the heading where the explosion had occurred and clasping hands with four of the workmen started to lead them out to safety, Balls in front and Strandquist in the rear. Death won by only a few feet, as the huddled bodies found by the rescuers showed later.

They had passed through a crosscut near the face of the heading and started out of the aircourse ahead of the deadly afterdamp. In this manner the six men groped their way in the darkness half a mile. They were within 700 ft. of safety when the afterdamp overtook them. Balls was found bending over his companions in an apparent effort to urge them forward.

It is such heroism as this that makes us proud of our relation to the mines. Not always is the story of self-sacrifice made as clear by the evidence as in this case; but miners are always willing to do their part and run their race with death despite their knowledge that the odds are desperately against their winning.

The Carnegie Hero Commission should recognize the services of Balls to his fellows and add something to the compensation which the state directs shall be paid to his widow and five children, for they have given for others more than others can ever return to them. Strandquist was a young man and single, but possibly leaves bereaved ones to whom a medal might well be given.

Balls had often made up his mind what he would do in such an emergency. He had pictured vividly the event much as it actually occurred and had prepared himself to meet it. Would that we who permit ourselves such visions would cease waiting on mere circumstance and prove ourselves, now in face of present conditions as generous in our lives as Balls and Strandquist were in their dying hours. We wait expectantly almost for the hour of disaster that we may show our mettle. If only we could exhibit a like kidney in our daily task the world would be lightened with the beauty of our heroism.

Department of Human Interest

School Consolidation at Gary, McDowell County, W. Va.

By C. H. Archer*

SYNOPSIS—Consolidation has saved money at the Gary schools. The per capita cost of education is only $25.74 per year, which is $2.58 lower than the per capita cost for the entire state. Lunches are served to the pupils, and for these a charge of 6c. is made, which meets the expense without loss.

Feeling the need of closer supervision in the schools and understanding the advantages of consolidation, the Board of Education of Adkin District, McDowell County, West Virginia, in 1912 began the work of consolidating eight small schools, and transporting the pupils from the various plants of the United States Coal and Coke Co. to the central plant located at Gary. The large building that was described on pp. 601-604 in the Apr. 1 issue of *Coal Age* was erected in 1912-13. Three comfortable school transportation wagons were purchased, and teams and drivers were supplied by the United States Coal and Coke Co.

The school was opened in the fall of 1913 with six teachers and 260 pupils. Later in the year two more teachers were added, and the enrollment was increased to 350 before the close of the year's work. This enrollment included eight first-year high-school pupils.

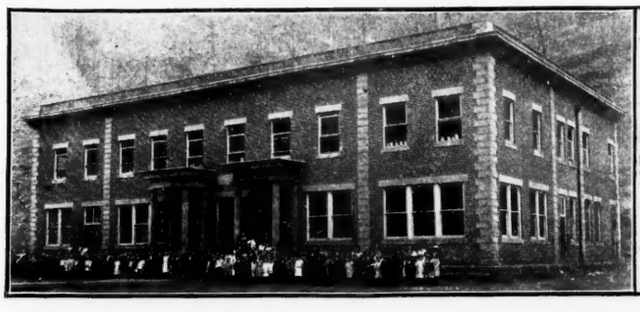
At the beginning of the second year (1914) a teacher of domestic science was added to the force, the standing of the high school was raised to second class and some additions were made to the library and equipment. While the enrollment of the high school was increased to 18, that of the entire school was cut down to 275 by the removal of many families from the territory, due to the financial depression prevalent in the Tug River section at that time. Five pupils were promoted to the high school at the close of the year, all of whom entered upon their high-school work at the beginning of 1915.

At the beginning of the present year (1915-16) the teaching force was increased to ten (and afterward to eleven), and on account of the increase in the number of pupils the board of education found it necessary to establish primary schools in the abandoned school buildings in the surrounding plants in order to take care of the overflow. In these primary schools 150 pupils were taught. The upper grade pupils, about 120 in number, are transported to the consolidated school in the school wagons.

The enrollment of the consolidated school, exclusive of the primary schools previously referred to, is 325. This number represents those who are actually attending school week after week, while the maximum enrollment, which includes all who have enrolled during the year, will probably reach 400.

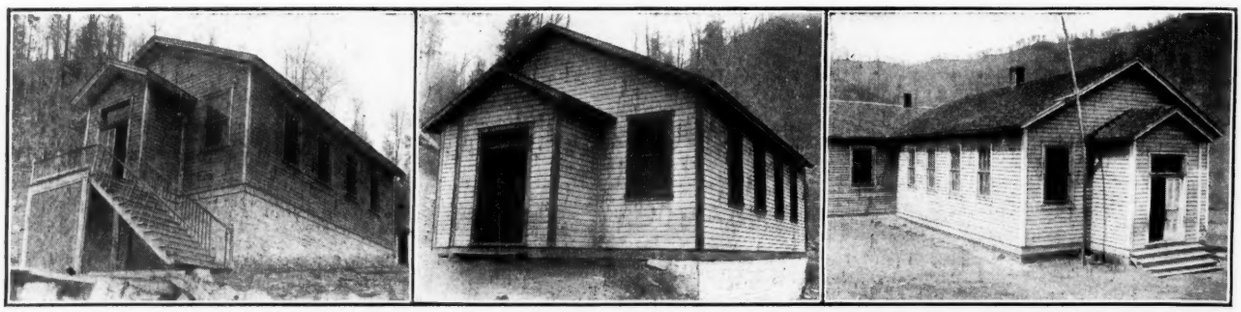
*District superintendent, Adkin District, Gary, W. Va.

BY GRADING, THE GARY CHILDREN HAVE BEEN PROVIDED WITH A LEVEL PLAYGROUND THOUGH THE COUNTRY IS MOUNTAINOUS



NEW BUILDING REPLACING LOCAL SCHOOLS

HAULING RAW MATERIAL TO CULTURE FACTORY



THREE OF THE MANY SHACKLIKE SCHOOLHOUSES NOW REPLACED BY THE CENTRAL SCHOOL BUILDING
Three of the schools to relieve overcrowding are still used for primary-school purposes

First-class apparatus for the study of domestic science, biology, agriculture and manual training has been installed, and a substantial addition has been made to the library.

Noon Lunches Provided for 6 Cents per Pupil

One of the most attractive features of the school work is the pupils' lunchroom, which the three primary teachers have in their charge. Substantial lunches, consisting of soups, sandwiches, cocoa, fruits, etc., are served to the pupils at a cost of 6c. each. The food is excellent, and while the menus are not elaborate, the lunches are sufficient for any pupil and are a great improvement over the average school lunch. The equipment for the lunchroom was purchased by the Board of Education, but by careful buying the enterprise is self-supporting.

A lyceum course, which is receiving splendid support from the people, is being conducted under the auspices of the high-school department. The school has two basketball and one baseball team. Arrangements are being made to provide tennis courts and a baseball ground on the school property. The agricultural department is beginning the work on the school garden, which will provide pleasant and profitable employment for the pupils during the summer.

Better Education at Lower Than Average Cost

The cost of maintaining the school plant is approximately $9,000 per year, which places the per capita cost of education in this school at $25.74 per year. This cost is $2.58 lower than the per capita cost for the entire state, while the advantages offered are far above the average. These figures show that a strong consolidated school can be maintained in any group of industrial plants by efficient methods and strict economy.

The United States Coal and Coke Co. has a special teacher of night schools for the employees. These schools are conducted at different plants each night, the teacher giving his entire time to the work, which has also been placed under the general supervision of the superintendent of schools.

The school population of the district is increasing by leaps and bounds, and the present building will soon be totally inadequate for the needs of the school. Within two years a high-school enrollment of 200 is expected, which will certainly necessitate the erection of another building. Thirty-six free school diplomas were granted in the district this year, and these pupils will be enrolled in the high school next year. As the school population increases, arrangements will be made to take care of the pupils, to the end that every child in the district may have the advantage of a high-school education.

The average cost of hauling the pupils to school is $1.55 per pupil per month, the average haul being two miles over dirt roads that get very muddy and rough in the winter.

Radley Community Center

Special Correspondence

SYNOPSIS—An institution to provide for the pleasures of mine workers' children is started by a woman-philanthropist on her own initiative. It is making rapid progress.

In order that the children of a Kansas coal-mining camp might, amid beautiful surroundings, play and attain a greater power of self-expression, Anna Marcet Halderman, vice-president of the Girard Kansas State Bank,

RADLEY PATRIOTS HOLD A VALENTINE PARTY

MISS HALDERMAN'S JOLLY CLUB AT RADLEY

who, by the way, is a niece of Jane Addams, of Chicago, organized the Jolly Club of Radley, Crawford County, Kan. It promises to become one of the most important community centers of the state.

Though situated in the center of the rich bituminous coal fields of southeastern Kansas, Radley offers its children few of the opportunities for wholesome amusement freely bestowed upon children of cities. An occasional dance, a picture show and some pool halls offered all the amusement to be found. At these places beauty was an unknown thing.

Riding through the mining village one day last October, Miss Halderman was troubled by the sight of children sitting idly around with no pleasures to animate them. She wondered what the boys did when their day's work in the mines was done. Many of the boys go to work underground at an early age, and she felt that they should

MISS A. M. HALDERMAN
The social leader of the miners' children at Radley, Kan.

be given a place where they might amuse themselves under proper conditions so as to develop self-expression in a higher degree.

To carry out such a plan, organization was necessary. With this end in view, Miss Halderman made a trip to Radley, and there, sitting on the front steps of the picture theater, she accosted the young people as they came from the show, asking them to join her club. Within the show's half-darkened hall the Jolly Club of Radley was formed and became the nucleus of a great community center. This club was formed of young men and women from 16 to 18 years of age, who met Friday nights to dance; and already three other clubs have been formed—the Radley Patriots, the Reading Circle and the Sunflower Club.

Recently Miss Halderman purchased a 7-acre tract near Radley, on which the members of these community clubs may play. On this tract will be tennis courts, a baseball diamond, a running track, and a playground for the smaller kiddies. It is Miss Halderman's intention to build a community house on this tract eventually. Her plans for this home are still vague, but it will include a room for each of her clubs and one for the reading circle.

The Radley Patriots is a club of boys from 13 to 16 years old, and the Sunflower Club is of girls of similar ages. The Reading Circle is open to all. Sunday baseball will be permitted on the community diamond, but cigarette smoking for boys under 18 years of age is prohibited.

Four nights a week during the past winter Miss Halderman has made the five-mile trip from her home in Girard to Radley in the interest of these clubs, amusements, peculiarly suited to the ages of the members, being arranged in each club.

Thus is being established a community center whose objective point is the development of highest efficiency through natural self-expression.

The Colliery Tram

In a paper on the "Logic of Trams," read before the North of England Institute of Mining and Mechanical Engineers, John Gibson referred to the colliery tram as the "maid of all work" and the "Cinderella of mining appliances." The phraseology attracted attention and was the subject of playful comment. Unabashed, Mr. Gibson has given, through the medium of the technical press, the reasons for the view stated, pointing to the following uses of the mine car in addition to its principal duty of carrying coal:

(1) Taking food, fodder, timber and stores into the mine; (2) taking dirt to the spoil bank or to the stow road; (3) transporting ashes from boiler house to the ash dump; (4) as an ambulance; (5) as an integral part of endless rope tension gear; (6) as a ferry over wet depressions or swamps.

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Everything at the mines worked fine and all previous daily outputs had been broken, so, closing up the office, I walked up to my home. I was indeed happy and satisfied. As the front door opened, my wife met me and I knew instinctively that there was to be trouble.

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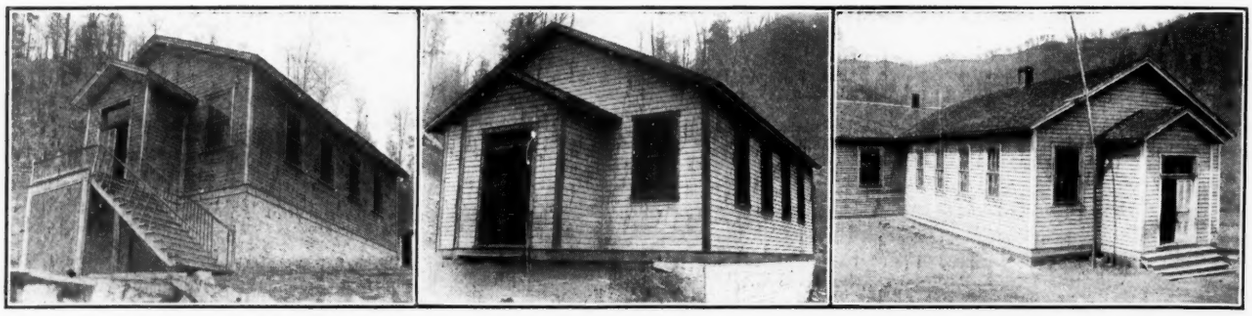

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Everything at the mines worked fine and all previous daily outputs had been broken, so, closing up the office, I walked up to my home. I was indeed happy and satisfied. As the front door opened, my wife met me and I knew instinctively that there was to be trouble.

"Well, its here," was the way she greeted me. "What is here?" said I, in surprise. "What you ordered. Look over there in the cupboard and find out." The cupboard was examined, and to my surprise, there, wrapped up in

a nice paper box, was a two-gallon jar of whisky. On a tag attached to it were the words: "To the Supt., from ——— Distillery Co." Turning to my wife, I informed her that there must be some mistake, that the whisky had not been ordered by me. "Well," says she, "how would it arrive had you not ordered it?"

The next morning the following note was sent the distillery company: "Gentlemen: There was left at my house by you a two-gallon glass jar of whisky. As this was not ordered, I fear a mistake has been made and would be pleased to have this package removed." Two days later a stranger entered the office. He informed me that he was the liquor distiller and had received my letter, that no mistake had been made and that the whisky had been given to me merely as a token of the high esteem in which I was held by his company.

Turning abruptly toward him and looking him straight in the eye, I said: "You say you are giving me that whisky for nothing. Your statement is not true. You offer me this to get my good will, so that you or your agents can trespass on our property to take orders and deliver your whisky to our miners. The worst enemy our miners have is your rotten whisky. More murders, fights, family troubles, accidents, idleness, poverty and labor troubles are due to the use of your product than to all the other forces combined with which we have to contend. When I want whisky it will be paid for with money, not with such pay as you tried to induce me to give. Good day, sir."

Garden Book for Mine Workers

The brilliant pictures of the Consolidation Coal Co.'s Garden Book are the brightest things which have appeared on the *Coal Age* desk this spring. The illustrations are in eight or more colors.

The preface ascribes the book to the activities of the Welfare Department, and adds: "This, our first, garden book is written for the employees of the Consolidation

CONSOLIDATION COAL CO. PUBLISHES BOOKLET ON GARDENING

Coal Co. with the hope that it will help in making homes more beautiful and surroundings more attractive."

The book gives the following suggestions:

Varieties of Flowers for Massing in Front of High Porches, Sheds, Etc.—Castor-oil plant, sunflower, cosmos and hollyhocks.

For Borders or for Grouping in Beds—Zinnias, marigolds, scarlet sage, nasturtiums, geraniums, bachelor buttons.

For Vines on Porches and Over Fences—Morning glories, nasturtiums, hops, gourds and grape vines.

For Boxes—Nasturtiums, wandering jew, geraniums and coreopsis.

In planting it is best to have all of each variety together rather than to mix them. Plant in masses and leave open spaces for grass.

An example is shown of a house where this method of planting has been adopted with conspicuous success. Two illustrations show a home without flowers and its appearance after a little time and trouble have been expended on beautifying the ground around it. As the booklet states, with a group of castor-bean plants in front of the high porches—for the residence stands on a steep side hill—the house would be even more attractive. Pole beans or lima beans, it suggests, should be grown on the shed in the rear.

Then follow a few practical reflections and some advice:

Even a small piece of ground, if well taken care of, will raise both early and late vegetables. The more you raise the more you save. What you grow is better, fresher and cleaner than what you buy. Vegetables just out of the garden have more food value than those which have been shipped. Having a garden means having different kinds of food, which is just as important for people as it is for chickens or stock.

Meat is the most expensive food we eat. If we have more vegetables we do not need so much meat. Most people eat too much meat and too little vegetable food—partly because of habit and partly because meat is easy to cook. Eating much meat not only costs us much money but is not good for the health. Working out of doors in a garden, seeing things grow, breathing clean, fresh air is good for us all.

To have a successful garden: 1. Make fine, firm seed beds. 2. Keep the top soil loosened. 3. Give the plants a drink when rain fails. 4. Remember, weeds and a garden can't thrive together.

Every family can have a garden. If there is not a foot of ground, there are porches and windows. Wherever there is sunlight, plants may be made to grow, and one plant in a tin can may be a more helpful and inspiring garden to some mind than a whole acre of lawn and flowers may be to another.

The book gives a list of free bulletins which can be obtained from the Secretary of Agriculture, Washington, D. C., and they may be quoted here, as other coal firms than the Consolidation Coal Co. may desire to give them publicity:

No. 185, Beautifying the Home Grounds; No. 195, Annual Flower Plants; No. 218, The School Garden; No. 220, Tomatoes; No. 255, The Home Vegetable Garden; No. 289, Beans; No. 295, Potatoes and Other Root Crops as Food; No. 546, How To Manage a Corn Crop in Kentucky and West Virginia; No. 553, Pop Corn for the Home; No. 609, Bird Houses and How To Build Them.

The book advocates the building of a rustic arbor covered with the five-leaved Virginia creeper, the material for which—plants and poles—can be found in the woods.

Gillespie, Ill., First-Aid Day

Local Union No. 730 of Mine No. 1, Gillespie, Ill., and the Superior Coal Co., will hold their fourth annual first-aid day at Gillespie, Saturday, May 20, 1916, at which there will be five contests, for which $500 in prizes will be presented. There will be two contests for men—one betwen teams and the other between individual contestants—a team contest for boys under 17 years of age, a team contest for girls under 17 years and a team contest for those employees of the Superior Coal Co. who have never competed before.

John P. White, the international president of the United Mine Workers of America; Frank Farrington, state president of that organization, and David Ross, former secretary of the Bureau of Labor Statistics, will address the people assembled and view the contest.

A big mine-rescue demonstration, in which the new safety life line will be demonstrated, will lend a touch of realism to the first-aid exercises. The United States Bureau of Mines will show pictures illustrating mining conditions and mine dangers. J. R. Greer, of Gillespie, is secretary of the meet.

Discussion by Readers

The Miner and Safety First

Letter No. 9—My attention was recently arrested, in reading an advertisement in one of our leading coal trade journals, by the statement, " 'Safety First' should be more than a phrase." The advertisement went on to show that the human element in industry was being considered today to a much greater extent than ever before, since men at the head of affairs realized that it was "good business" to do so and that it made for greater loyalty and coöperation on the part of employees. The natural inference was that the old days when the life of a mule was considered of more value than that of a man had gone never to return.

It must be admitted that much has been done during the last few years to make the life of a coal miner less hazardous than under former conditions. Laws have been enacted to safeguard men who must work underground and to prevent the occurrence of mine accidents, by compelling the observance of certain rules and regulations by both miners and operators. It is evident to all that if these safety rules were always observed they would go far toward preventing many disasters involving loss of life and property.

It must be recognized, however, that no legislative act can change human nature. The operator who has thus far succeeded in evading the law and operating his mine by antiquated methods is willing to "take a chance" rather than spend a few dollars for the purpose of safeguarding his mine and the lives of his workmen as far as is humanly possible. The miner who has for years been doing certain things that are dangerous, with no bad consequences, becomes blind to the danger he incurs and, instead of carefully observing each rule of safety, "takes a chance," although he knows the rules have been made to safeguard his own life and the lives of his fellows. Too often the results of this reckless disregard for safety on the part of the miner have been appalling.

It is but a natural conclusion that no matter what steps are taken to prevent accidents occurring in mines, they will continue to happen every day, either through carelessness or from causes beyond the power of man to control. If this is true, it is surely the part of wisdom and good sound business sense to be prepared to minimize the effects of accidents when they occur. Thousands of lives and hundreds of thousands of dollars are sacrificed each year in the coal mines of this country by reason of explosion, falls of roof and coal, and the poisonous effects of mine gases.

Many lives and much property could be saved if those in charge of mining operations were prepared for such occurrences and equipped in such a manner that efficient rescue work could be performed promptly following an accident. The poisonous gases that are generated by the explosion of gas in a mine make it dangerous for men to enter the mine for rescue work, unless they are equipped with some efficient type of breathing apparatus. If this apparatus is faulty in construction or out of order from not being carefully inspected and kept in readiness for use, it becomes a death trap to the wearer, who is not only prevented from taking his share in the rescue work, but becomes at once a hindrance and a burden to his comrades, whose first duty then is to take him back to a place of safety.

Owing to the large number of different types and styles of mine-rescue apparatus now on the market, it is not only the duty of every coal-mine operator, but much to his advantage considered from a sound business standpoint, to acquaint himself fully with the merits and demerits of these different appliances and to ascertain their relative efficiency and safety. Little reliance can be placed on the claims made by salesmen, whose views are naturally biased in favor of their own interests.

Tests of such apparatus conducted in smoke chambers are seldom convincing and never conclusive, while exhibition contests at state fairs and safety meets, though often spectacular, fail to prove the relative efficiency that it is desired to ascertain. It seems to me that if coal operators in competitive fields would invite the representatives of the manufacturers of these different types to meet at some central point, where the working of the different types could be judged by experts, it would be possible to determine which is the best and safest type for mine use in rescue work. THOMAS C. YARNALL.

Chicago, Ill.

Drilling and Shooting Coal

Letter No. 4—So far as this question has been discussed from the standpoint of danger, the emphasis seems to have been placed mainly on deep holes or holes drilled beyond the shearing or mining, into the solid. My experience as a miner and shotfirer has been that shallow holes and holes drilled weak on the point are equally dangerous with the deep and solid holes.

Some miners believe that all deep and heavy shots, under all conditions, are dangerous and are responsible for the "windies" so often felt in some mines, while light shots are not dangerous and will not produce a "windy." However, experience and observation as a miner have taught me that this idea is not always true. A light-burdened or shallow hole overcharged is more dangerous than a deep and heavy shot well proportioned and properly charged. One of the strongest windy shots I ever felt in a mine was caused by a very small charge in some top coal that adhered to the roof where a pillar was being drawn. Not over four inches of black powder in an ordinary sized cartridge was used.

I do not want to be understood as favoring deep and heavy shots in preference to shallow and weak-pointed shots, but I am of the opinion that both classes of these shots are alike dangerous if improperly charged and tamped. The nature of the tamping used, in many instances, evidently has much to do in producing windy shots. I am acquainted with a certain mine in which

the coal averages about 5 ft. in thickness and is very hard to break, requiring large, deep holes and excessive charges of powder. While both dynamite and black powder were used to charge the cracker shots, and slack coal was employed for tamping, this mine had many windy shots. But when the use of mixed explosives in the same hole was forbidden and all solid shooting was required to be tamped with clay, the windy shots were practically eliminated.

Williams James, in the conclusion of his Letter No. 4, "Handling Explosives in Mines," *Coal Age,* Jan. 8, p. 90, regards a shot that has only cracked the coal and is followed by other shots that ignite the smoke and gases escaping from the cracks, as a logical cause of many windy shots and one that may often cause a dust explosion. For instance, take this same narrow heading, with the same number of shots to be fired in quick succession, and suppose the coal is of a dusty nature and the shots, having been prepared by an inexperienced miner, are overcharged. As these shots go off, they raise much dust and leave it suspended in the air, as well as greatly heating the air. Now, say the fifth shot is very weak on the point. In such a case its full force and flame would be projected into the heated and dust-filled space of the room, with the result that a heavy windy shot is produced that causes an explosion if the coal is inclined to be dry. I deem it unsafe to fire five shots in a narrow heading.

Employment of Shotfirers Advocated

I agree with the suggestion of Edward H. Coxe, in his Letter No. 1, Mar. 25, p. 548, where he remarks, "The employment of shotfirers is always the safest plan, whatever the natural conditions in the mine." And if the mine is dusty and liberates gas even in small quantities, especially is it essential to employ shotfirers. In fact, I believe this should be mandatory or required by law. Shotfirers should be men with a broad and practical mining experience, industrious, thoughtful and honest, resourceful and of sober habits. They should be given all the time necessary to carefully tamp and fire all shots, and in dry mines they should examine for any fires afterward. Shotfirers should charge all shots, for there are always a few reckless miners who will take unnecessary risks many times in planning, overcharging and improperly tamping shots they expect to fire themselves; and it stands to reason that this same class of miners will be more careless in preparing shots for others to fire. As has been already stated, all shots should be tamped with clay, and in dry, dusty and gaseous mines no explosives but permissibles should be used. It will do very well to talk about firing shots by electric current from the outside, but in the average mine this is hardly practicable. We must therefore deal with the question, in this respect, as we find it. Shots in coal mines in this section are not now being fired in this way, and I suspect it will be some time yet before that system of firing is adopted.

A good argument for the employment of shotfirers is to be found in the following citation: Assume a dry and dusty mine liberating some explosive gas, and in which a hundred coal diggers are employed, who shoot but once a day. There will be an average of at least two shots to the digger, or a total of 200 shots to be fired at firing time. If firing time begins in all sections of the mine at the same time, as it most generally does, these 200 shots will be fired in a very short space of time, evidently heating and charging the air with dust. When shots are fired thus in all sections of the mine at the same time, and especially if some of them are "windies," the air current becomes greatly agitated and may be short-circuited in some sections by doors being blown partly open and failing to close again.

With shotfirers employed, under these conditions, the danger arising from disturbed or agitated air currents would be mostly avoided, as the shots would be fired only in one part of the mine at a time, and then only one or two at a time.

Danger of Not Enforcing Mine Discipline

By stringent rules rigidly enforced, shotfirers should not be permitted to enter the mine until all the miners are out. And then, if by carelessness on their own part a disaster occurs, no one but themselves will suffer. Oftentimes it is a much easier matter to make rules than to enforce them. It is, also, easier to enforce a rule among two or three men than among a hundred. In the closing paragraph of his letter Mr. Coxe sums up the whole situation in regard to safety in mining in a few words, when he says: "It is important to make rules looking toward safety, but what is of still greater importance is the enforcement of the rules after they are made." I fully agree with his conclusion that "more disasters are due to the lack of enforcement than to the lack of rules." U. S. Wilson, *Coal Age,* Apr. 1, p. 564, gives a striking illustration of the effects or results of having rules and not enforcing them at all times. In the case he cites it cost the lives of 18 men, whereas if the rule in regard to the time of the shotfirers entering the mine had been rigidly enforced only the two shotfirers would have lost their lives. I am acquainted with both the mine and the incident referred to here.

John Rose,
Dayton, Tenn. Former State Mine Inspector.

Letter No. 5—The conditions under which the blasting of coal and rock is carried on in mine workings are so diversified that it would be practically impossible to formulate rules or make suggestions in regard to the manner in which this work should be done in any particular case. The mining laws in the different states can do nothing more along this line than to make such general provisions as will apply to conditions common to all mine work. In this respect the laws of Pennsylvania are ample and stringent and cover the general features thoroughly.

Judgment To Be Exercised in Blasting

In the blasting of coal there are necessarily many particulars that must be left to the judgment of the mine officials, shotfirers and miners. For example, the matter of placing a hole so that a shot may do its most effective work, and to insure the greatest safety, will depend on whether the coal is undercut, centercut, topcut, or sidecut or sheared. On this point the law should state that the hole shall not be drilled into the solid or deeper than the cutting. The conditions that regulate the depth of the hole vary in different seams and should be carefully studied by the miner or the shotfirer. Where the parting between the coal and the

roof or floor is favorable, the hole may be drilled to the depth of the cutting. However, experience shows that this is not advisable under certain conditions, especially in thick seams where the coal shoots hard. I have found that better results are generally obtained by locating the charge from 4 to 6 in. in front of the face of the cut. These features will, of course, vary in different localities.

Again, when a seam is worked in two benches that are taken out separately, the same rules will not apply. In any case, when a hole is located above a cut or mining it must be remembered that the force of gravity will assist the powder to perform its work, and experience will then dictate the length of hole that will produce the most effective results. Always, a hole drilled on an angle with the face of the coal will be longer than one that is more normal to the working face. In drilling a rib hole, the tendency is to start the hole as close as possible to the rib, with the result that the angle the auger makes with the rib will often cause the hole to pass beyond the rib line. The best judgment of the miner is required to prevent this, which is a frequent cause of blownout shots. Similarly, when a charge is located too close to a hard boulder or a hard roof or bottom the results are likewise dangerous. This is a matter that is not as well understood by miners and many shotfirers as its importance demands. When a charge of powder is laid too close to a harder stratum than that in which it is embedded, the force of the explosion is exerted with two-fold effect in the opposite direction, often with disastrous results.

Weight of Charge and Manner of Firing

The weight of charge or quantity of explosive required to perform the work in any particular case is another point that must be left to the judgment of the men in charge. There is probably no feature in the blasting of either coal or rock, in regard to which opinions differ as widely as they do in respect to the amount of explosive required to do the most effective work. The rules that are frequently given for calculating the weight of charge with respect to the thickness of the seam, diameter of the hole and the line of least resistance are only suggestive and must be modified to suit the conditions, which the miner learns to interpret correctly by long experience in a way that seems intuitive. The judgment of an experienced miner thus becomes the safest criterion in this regard.

Another important feature that is often overlooked is the fact that holes should not be drilled in the coal before the undercut is made. The reason for this is that it frequently happens that the coal cannot be undercut to a uniform depth, owing to some obstruction or physical condition that makes this impracticable. In such a case, a hole drilled before the coal is cut would probably locate the charge on the solid with disastrous results. I have frequently had occasion to stop men whom I have found drilling a hole before the machine has cut the coal.

In respect to firing the charge, I agree with Mr. Cox when he says, *Coal Age,* Mar. 25, p. 549: "The safest practice is firing by electricity . . . after the men have all left the mine." While, with the use of incombustible material for stemming, it is possible to fire black powder safely with a squib, provided the match is not shortened or the squib oiled to hasten its rate of burning, I believe the electric battery provides the safest means of firing shots in mines, and with the introduction of approved explosives such a battery seems imperative.

Shots To Be Tamped Full Length of Hole

Many miners do not have a proper knowledge of the approved explosives that are being so largely introduced in coal mining. They seem to think that these explosives, particularly the nitroglycerin compounds, require no particular tamping, and all that is necessary in preparing a shot is to use a "dummy" cartridge, or insert a wad of paper in the mouth of the hole to exclude the air and use a short length of fuse. It seems to me important to impress on all miners and shotfirers the necessity of stemming the hole its full length. The suggestion that a scraper should be used to clean the hole of all dust is a practical one, and this together with the use of detonators of a proper strength should be made compulsory. I regard a squib detonator as a dangerous contrivance, the careless handling of which has, at times, has caused the death of miners.

Shotfirers, in my opinion, should be employed in most mines, and they should have a thorough knowledge of the explosives they handle, the laws regulating blasting and the duties they must perform. It is an error to assume that when a slip occurs in the bottom of the coal or floor of the seam and is inclined back from the face that this condition gives a loose end to the coal above and that undercutting at that point is unnecessary. Yet, I have seen shotfirers charge and fire holes under these conditions without the shot being mined. The suggestion that blasting should commence on the end of the air and proceed against the air current is also an important one and should be followed by all shotfirers who perform their work at night when the men are out of the mine.

A. M. Iner.

——, Penn.

Handling Explosives in Mines

Letter No. 7—An experience of 20 years in the handling of different classes of explosives in coal and rock-work, while serving in the several capacities of miner, fireboss, shotlighter, mine foreman and mine superintendent, besides acting as general rock contractor for a period, has made me greatly interested in the discussion of this subject in *Coal Age.* My interest is greater by reason of the fact that I have witnessed many serious accidents growing out of careless methods of handling the explosives used. Believing that a thorough discussion of the subject will assist in avoiding these accidents by compelling the adoption of safer methods, I offer the following points suggested by my own experience.

Care of Explosives on the Surface

1. Storage of Explosives—The magazine in which explosives are stored should be thoroughly ventilated and well drained. Good drainage is a matter of first consideration, because all explosives deteriorate quickly in damp places. Advantage should be taken of any natural features, such as a cave or hillside that would afford good protection in the event of a possible explosion occurring. If such natural features are not available, artificial barricades of sand or mounds of earth should be constructed

about the magazine and made to rise 2 or 3 ft. above the roof line. No large stones or bricks should be used in the construction, as these would be converted into dangerous projectiles in case of an explosion. It should be remembered that danger of explosion occurring in a magazine emanates mostly from sources outside of the building, the walls of which should be proof against rifle bullets and fire. The building should be further protected against lightning and provided with secure fastenings that will prevent unauthorized persons from entering.

2. Detonators—On no account should detonators, or blasting caps, or other fulminating composition be kept in the same building with powder and dynamite.

3. Thawing of Dynamite—Every practicable means should be used to prevent the freezing of dynamite stored in the magazine, the temperature of which should be sufficiently high to avoid this trouble. However, when dynamite is frozen it must be thawed before using, in order to secure a maximum efficiency of the explosive. No attempt must be made to thaw the explosive by placing a frozen cartridge before a fire or near a boiler or on a steam pipe. While being thawed, the explosive is very sensitive and must be handled with the greatest care.

Cartridges of dynamite, while being thawed, should lie in a horizontal position to prevent the exuding of the nitroglycerin from the cartridge, which would be a source of much danger. When thawing a small amount of dynamite for the day's use, I have employed a water-jacketed tin vessel in which the cartridges are laid and which is then closed tightly. Before the water enters the jacket, it should be raised to a temperature not exceeding 130 deg. F. The cartridges are allowed to remain in the thawer until a gentle pressure shows that they are completely thawed.

The thawing of dynamite must never be attempted near a magazine where the explosive is stored. At times thawing houses are constructed at a safe distance from the magazine and having a capacity that will permit of the thawing of larger quantities of the frozen explosive, but this should never exceed a day's supply. The frozen cartridges are then laid on a shelf, and the temperature within the building is raised sufficiently to thaw the frozen powder. This is accomplished by means of radiators through which low-pressure steam not exceeding 5 lb. gage is circulated. Where time will permit, a lower temperature, say 90 deg. F., is to be preferred. I have used the plans and methods described and found them successful in the northwest provinces of Alberta and British Columbia, where the temperature often drops to 30 or 40 deg. below zero and, as a consequence, the care of explosives and the treatment of frozen dynamite is important.

Mining Laws Relating to Explosives in Mines

The amount of powder taken into the mine at one time should not exceed what is needed for a day's supply. This regulation is incorporated in the mining laws of Colorado and New Mexico. However, in my opinion the law restricting the amount of explosives taken into the mine should be more definite than this. Compare sections 150 and 151 of the Colorado Mining Laws (1913), for example, with article 16 of the bituminous mine law of Pennsylvania, or General Rule No. 11 of the Coal Mines Act of British Columbia, which read as follows:

Mining Laws of Colorado (1913):

Sec. 150—Only enough powder for one day's use shall be permitted to be taken into a mine on any one day by an employee, and no employee shall have more than one day's supply of powder in the mine at any one time.

Sec. 151—All powder taken into the mine shall be kept in a safe box constructed of nonconducting material and spaced at least 5 ft. from any track, except in longwall working, and at least 25 ft. from any similar box.

Bituminous Mine Law (Penn., 1911), Art. 16:

Section 1. No powder or high explosive shall be stored in any mine, and no more of either article shall be taken into any mine at one time, by any one person, than is required in one shift. The quantity shall not exceed five pounds; provided that in a mine where shotfirers are employed the shotfirers shall have the right to take a sufficient quantity to complete their work.

Black powder for use in mines shall be put up in 5-, 10-, 15- and 25-lb. metallic cans or canisters, or receptacles of equally safe material.

No black powder, high explosives or detonators shall be hauled on any electric-motor trip in any mine, unless the same are incased in nonconductive boxes or receptacles.

Sec. 2. In such portions of dry and dusty mines wherein explosive gas is being generated in quantities sufficient to be detected by an approved safety lamp, no explosives shall be used except "permissible" explosives, as designated by the Testing Station of the Federal Bureau of Mines. Each charge shall consist of only one kind of explosive. The Department of Mines shall forward to the operators, upon application, the names of all explosives on the permissible list.

No "permissible" explosive shall be sold for use in bituminous mines, unless the name of the manufacturer, name of explosive, method of handling and full instruction for use are conspicuously displayed on or in the package containing the explosive.

Sec. 3. Detonators shall at all times be kept in securely locked cases, separate and apart from other explosives, until required for use.

The Chief of the Department of Mines, when satisfied by tests that any permissible explosive has deteriorated from the standard established by the Testing Station of the Federal Bureau of Mines, and thereby become dangerous, may prohibit the use thereof, either absolutely or subject to conditions.

Coal Mines Act, British Columbia:

General Rule 11—Gunpowder or other explosive or inflammable substance shall only be used in the mine and underground as follows: (a) It shall not be stored in the mine. (b) It shall not be taken into the mine, except in a case or canister containing not more than 4 lb. (c) A workman shall not have in use or in his possession, at one time in any one place, more than one of such cases or canisters, nor shall there be more than 4 lb. of powder in any such can, etc., etc.

Explosives should always be carried into the mine in small canisters holding sufficient only for the day's supply, and where electricity is used in the mine, the canister should be made of nonconducting material. A good plan is to arrange that each man's supply of powder shall be delivered in his working place during the night and placed at his box ready for use the next day. Where cartridges of black powder are used these should preferably be made up outside of the mine. If prepared by the miner in his working place, his lamp should be set at least 5 ft. away, where sparks cannot be carried by the air current to the powder. Many miners, neglecting to take this precaution, have met death owing to a spark dropping, from the burning lamp on his head, into the powder. The loose powder should never be pushed into the hole, that being a very dangerous practice because of the liability that the powder will be ignited by the friction of the tamping bar as the grains are rubbed along the rough sides of the drillhole. Moreover, loose powder is liable to run into cracks or crevices in the coal and result in a possible windy shot.

J. W. Powell,
Albuquerque & Cerillos Coal Co.
Madrid, N. M.

Many Unsigned Articles and Contributions to the discussion department of "Coal Age" are being constantly received that we would be glad to publish had the author signed his name. Names of contributors are withheld if so desired.

Inquiries of General Interest

Detecting Marsh Gas by Smell

During an experience of 27 years spent inside of mines in England and Pennsylvania I have observed that many experienced miners are able to detect the presence of marsh gas without the aid of the safety lamp, which is generally thought to be the miner's only means of finding this gas, although it is admitted that in testing for gas with a safety lamp much depends on the miner's judgment and his manipulation of the lamp flame.

Textbooks on mine gases all describe the several hydrocarbon gases as being "colorless, odorless and tasteless." The question I would like to ask is, If marsh gas (CH_4) is colorless, odorless and tasteless, how is it possible for experienced miners to unfailingly detect its presence by their physical senses? When an old miner walks into a body of this gas, he becomes aware of its presence at once, and exclaims, "She's there!" meaning that he has detected the presence of this gas in some occult way, which is generally ascribed to the sense of smell.

In order to make my meaning more clear, permit me to describe what was a daily occurrence in a mine where I was employed and where, it must be admitted, the conditions were favorable for finding gas in a nearly pure state. The coal seam being worked in that mine was about 5 or 6 ft. thick and separated from an overlying 3-ft. seam of coal by from 4 to 6 ft. of slate. This was a longwall mine, and it frequently happened that the gas in the upper seam caused a considerable fall of slate, owing to its pressure in the formation. A large hole or cavity was always left in the roof above the fallen slate, and this cavity quickly filled with gas. Before the slate could be removed, it was necessary to erect "hurdle sheets" to deflect the air into the cavity and sweep out the gas.

It was the invariable custom for the bratticemen to stand on a fall and raise their heads cautiously into the hole to ascertain if gas was there, and finding it, they would proceed to reduce the flame in their safety lamps and raise the latter carefully to the level where they had previously detected the gas. Never once have I seen an old miner fail to find the gas in the manner I have described. I may add that a lamp, after being withdrawn from such a body of gas, always had a peculiar odor that was easily detected by the miner.

For further information that may assist in explaining this method of detecting gas I would say that when erecting the brattice poles to support the hurdle sheets mentioned it was frequently necessary to stand on a loaded car. We were careful at such times to avoid raising our heads too high into the gas; but occasionally this would happen, with the result that the miner, after drawing a single breath, would tumble from the car. I have experienced such a fall myself and several times suffered severe bruises.

At times I have tried to explain these effects on the ground that, since marsh gas is lighter than air, a larger volume of the gas would be drawn into the lungs at a single breath than is the case with normal air, and I reasoned that this larger volume of lighter gas found its way readily upward to the brain, producing dizziness and causing the person to fall. I would describe the sensation as that of a heavy blow on the head, except that its force was seemingly outward and upward. I would like to see this question discussed by those who have had similar experiences.

JOSEPH A. GREAVES.

Dunbar, Penn.

What this correspondent has described is doubtless a common experience of miners working under similar conditions. The effects produced are undoubtedly either due to a mixture of gases or to pure marsh gas, which produces suffocation when undiluted, but which can be breathed with impunity for a considerable length of time when mixed with sufficient air. We shall be glad to hear from others on this question.

Stress in Hoisting Rope

We are having quite an argument at our mine as to whether the degree of the angle that the hoisting rope, passing from the sheave to the drum in the engine room, makes with the vertical has anything to do with the stress in that portion of the rope.

For example, assuming that this part of the rope makes an angle of 45 deg. with the vertical, the question is, Would the stress in this portion, due to the weight of the loaded cage, be any less if the engine were located farther back from the shaft so that the rope would make an angle 15 deg. greater, or say 60 deg. with the vertical? Some claim that the stress in the rope would be less, while others claim that it would not be changed.

——, Ind. ENGINEER.

The stress in the vertical portion of a hoisting rope is evidently equal to the weight of the loaded cage plus a certain additional stress due to the friction of the cage moving in the shaft. Ignoring the slight friction of the sheave, which is scarcely appreciable, the stress in the inclined portion of the rope reaching from the head sheave to the hoisting drum in the engineroom is the same, regardless of the angle this portion of the rope makes with the vertical.

The only difference in stress, due to a different inclination of the rope to the vertical, is in the force exerted on the foundation bolts holding the engine bed in place and preventing it from being lifted off the foundation or slid along its base. The lifting force exerted on the foundation bolts is equal to the stress in the rope multiplied by the cosine of the angle the rope makes with the vertical. The sliding force is equal to the same stress in the rope multiplied by the sine of that angle. Thus, as the angle between the rope and the vertical is increased, the lifting force is decreased, but the sliding force is increased, the former varying with the cosine and the latter with the sine of the angle.

Examination Questions

Mine Managers' Examination, Springfield, Ill., Jan. 10, 1916

(Selected Questions)

Ques.—What measures would you take to secure the best possible results from a fan, the capacity of which is limited and the demands on which reach dangerously close to the limit?

Ans.—The first step is to see that the airways are clear of all obstructions, and the distance of air travel shortened as much as practicable. All breakthroughs should be enlarged to the full size of the airway, and, as far as practicable, all sharp bends in the aircourses should be avoided. Special attention should be given to the entry stoppings, doors, overcasts, etc., to see that they are not leaking air. Double doors should be used at the shaft bottom and other important points between the main intake and return airways. Having given these matters attention, if there is still more air required, a careful examination should be made to see if the air current can be split at different points in the mine. These measures will increase the volume of air in circulation by decreasing the water gage, the power on the air being practically unchanged.

Ques.—What are the factors determining the quantity of air passing in a mine at any given time?

Ans.—The determining factors in the circulation of air through a mine or airway are the power applied to the air and the resisting power of the mine or airway or the mine potential, as made known by the ratio of the sectional area of the airway or the area of passage of the mine and the total rubbing surface, assuming the coefficient of friction or unit resistance remains constant.

Again, without reference to the mine or airway, the quantity of air in circulation is determined by the ratio of the power on the air to the unit pressure. Thus, 10 hp., or 330,000 ft.-lb. per min., effective on the air, will produce a circulation of 66,000 cu.ft. per min. against a pressure of 5 lb. per sq.ft., or slightly less than 1 in. of water gage, since $q = u/p = 330{,}000 \div 5 = 66{,}000$ cu.ft. per min.

Ques.—Does the needle of the miner's compass point due north and south when at rest? If it does not, in what direction does it point?

Ans.—The needle of a miner's compass points to the magnetic north when at rest and not affected by any local attraction. The direction of the needle indicates the direction of the magnetic meridian at the place of observation. The angle that the magnetic meridian makes with the true meridian passing through the North Pole is called the "declination" of the needle. The line of no declination, called the "agonic line," at present passes through Michigan, central Ohio, the Virginias and central North Carolina. At all places on this line the needle points to the true north. At places east of the agonic line the declination of the needle is west; that is to say, the magnetic needle points to the left of the true north, while at places west of this line the declination of the needle is east and the needle points to the right of true north. The declination of the needle is changing slowly from year to year, an average of about 3 min., west declinations increasing and east declinations decreasing that amount, generally, each year. This change, however, is quite variable.

Ques.—Placing the compass at the opening of a cross-entry and sighting along the main entry, we get a bearing of north 8 deg. west. The bearing of the cross-entry we find to be north 84 deg. east. These entries should be at right angles to each other, and the main entry should have a due north course. Are the sights properly placed and, if not, how much of an error has been made in putting them up, and in which of the entries has the error been made?

Ans.—The north entry, having a bearing N 8° W, and the cross-entry having a bearing N 84° E, the angle between these entries is $8 + 84 = 92$ deg. There is therefore an error of 2 deg. in the sights on one of these entries, assuming the error is wholly in one entry. Assuming that the declination of the needle at the place of observation is 6° E, and that this declination is not set off on the compass so as to enable it to give a true reading, the magnetic reading on a due north line should be N 6° W, and since this reading is N 8° W, the sights incline 2 deg. to the left or west of due north.

Again, since the two entries should be at right angles to each other, the true bearing of the cross-entry is due east, and for a declination of 6° E the magnetic bearing on the cross-entry would be N 84° E. On this assumption the error of 2 deg. is wholly in the sights on the main north entry.

Ques.—A dirt heap has a slope of 45 deg., measured by the clinometer. What is the height of the heap, the length of the slope from the bottom to top being 45 ft.?

Ans.—The slope of the heap forms the hypotenuse of a right triangle, the vertical of which is the required height of the heap. The height is therefore $45 \times \sin 45° = 45 \times 0.707 = 31.8$ ft.

Ques.—Two styles of mine cars are submitted to you from which to select an equipment for a new mine. In general build and in finish they are equally good, with no room for preference or choice. On being oiled and tested on an incline, it is found that one moves at an inclination of 1 in 42, the other at an inclination of 1 in 49. Which of these cars would you choose and why?

Ans.—The angle of inclination in each case is a measure of the resistance of the car to motion, or its rolling friction, the tangent of the angle of inclination being the coefficient of rolling friction. The car that moves on an inclination of 1:49 presents a less resistance to motion than that which requires an inclination of 1:42, since the coefficient of friction of the former is $1 \div 49 = 0.0204$, while the coefficient of the latter is $1 \div 42 = 0.0238$. Other things being equal, the first of these two cars, or the one moving on an inclination of 1:49, and having the smaller coefficient of friction, is the one to be chosen.

Coal and Coke News

Washington, D. C.

A two days' hearing was held last week by the Interstate Commerce Commission in the consolidated Lake-cargo coal cases. The hearings were not completed but adjourned until a time yet to be announced. A larger attendance of attorneys and traffic men was present than has been in evidence at any recent hearing before the Commission.

H. M. Griggs, coal and ore agent of the New York Central Lines was put on the stand to present the whole situation briefly from the railroads' point of view, including a history of the rates and rate groupings in Central Freight Association territory. W. S. Brownson, commerce counsel for the Chesapeake & Ohio conducted the examination of the witness on behalf of all the railroads.

As the case progresses, the fight will, it is believed, be defined as a contest between the West Virginia operators on the one side, Ohio and Pittsburgh operators on another side, and the railroads assuming a third position. It is expected that the testimony will indicate that the rail lines serving the West Virginia fields are not enthusiastically in favor of the proposal that the rates from West Virginia shall be made 15 cents higher than they now are so as to give the Ohio and Pittsburgh operators a better chance of getting business.

A Decision Reached

A decision has been entered by the Interstate Commerce Commission denying the application of the Pennsylvania Railroad Co. for authority to establish rates on bituminous and cannel coal from points on the Pennsylvania R.R. and its connections to water competitive points on the Maryland-Delaware peninsular lower than rates contemporaneously applicable on like traffic to intermediate points. The decision of the Commission set forth the following facts:

"It is shown by the evidence that the territory of destination is sparsely settled, is devoted mainly to truck farming and consumes much less coal and draws less of other traffic than better developed regions, and that the cost of operation of the peninsula lines is greater than that of lines serving a more thickly populated and manufacturing section, and it is asserted that reductions in the rates to intermediate points to the level of the proposed rates to the water competitive points would result in a loss of revenue of approximately $20,000 per annum."

HARRISBURG, PENN.

Many changes and improvements upon the present workmen's compensation act will be considered by the next Legislature. The amendments will be based upon suggestions made by Harry Mackey, chairman of the state board, and also discrepancies in the act disclosed by four months' practical operation.

Other points which the framers of the act have overlooked have come up day by day in the hearings before the board and the referees.

Based, as it is, upon the experience of European countries, all of which except Turkey have similar acts, the present law is considered by authorities upon compensation as the most perfect of its kind in its existence.

There has been some friendly criticism of the act, much of which is thought by the board and referees to be well grounded. They have from the beginning courted constructive criticism of the act from every quarter.

Many points not covered by the act have been discovered; for instance, it is thought that physicians and undertakers should be permitted to have a lien on the fund, or, better yet, that the award, instead of including medical expense to the claimant, should merely include his real compensation, and the payment for the medical and similar treatment for the first two weeks should be paid directly to the physicians. This would eliminate the criticism of that profession that many complainants who are awarded compensation are not living up to the true spirit of the act.

The chairman of the board also maintains that the period allotted by the act for medical treatment is too short. The medical fees should be made higher and the period during which medical treatment is permitted should be lengthened. In many cases a major operation is required after the two weeks' period, and under such circumstances the employee has to bear the greater part of the expense, which often amounts to several hundred dollars. This, they say, is contrary to the true spirit of the law.

Another defect, in the medical side of the act, is that it speaks of major and minor operations. So far the board has not been able to induce any member of the medical profession to specify what is a major and what is a minor operation. Operators and manufacturers are of the belief that they are all "major operations."

Disfigurement is another feature not covered by the act, although to most people mere disfigurement is equally as bad as maiming or injury. In many cases the person so disfigured will be handicapped in many ways, and a financial penalty should be placed upon the industry for such an injury, according to the views of the chairman. Another of his beliefs is that special damages should be allotted for the loss of a finger, instead of merely compensation for loss of time, as at present, since the loss of a finger is far more than a temporary disability. It is a permanent loss which may disable that person from returning to his work or trade.

A pathetic case, rather common too, for which it is proposed provisions shall be enacted by the next Legislature, is that of a crippled child, whose main source of support has been killed. In such a case, the child, if one day over 16 years of age, cannot recover a cent of compensation, although unable to earn any part of a living. Such exceptional cases, as children afflicted with blindness, or spinal meningitis, are pointed out.

Another grave defect in the act is that there are some employers who have not taken out any insurance and are financially execution proof. In such a case an employee injured while working for them is without financial recourse. It is proposed to compel such employers to insure in the state fund, although such a procedure has to overcome constitutional provisions.

In a recent case, which has aroused considerable interest, the wife was living apart from her husband at the time of his death. The act provides that a widow to recover compensation must have been living with her husband at the time of his death or be dependent upon him. A referee held that she was dependent upon him even though she was receiving no money from him. If the board reverses this decision, which has been appealed by the Pennsylvania Railroad Co., an amendment of the act will be necessary.

An Interesting Decision

An opinion in the case of Joseph Marcinko vs. the Peale, Peacock & Kerr Mining Co., was handed down by W. W. Champion, referee in the State Workmen's Compensation Law on Apr. 28. Martin Marcinko, aged 16, was instantly killed while engaged as a trapper boy in the mines at Ogle, Clearfield County, on Jan. 25, 1916, and the hearing was held in the case on Apr. 20.

The important point to be decided in the case was whether or not a man earning an average of $85 a month (as it was shown Joseph Marcinko was earning), with his wife were dependent upon Joseph Marcinko, their son. It was also shown that Joseph was a stepson of Mrs. Marcinko. The referee ruled that both were dependents upon the boy, who was 16 yr. of age and earning $7.50 weekly in the mines.

The opinion rendered by the referee states that upon the finding of the fact of dependency, there is awarded to Joseph and Bertha Marcinko the sum of $2 per week from Jan. 26, 1916, during the continuance of such dependency, however not exceeding a period of 300 weeks from the day of death. The payments are to be made semi-monthly by the coal company. The funeral expenses of the deceased, amounting to over $100, were paid by the employer.

Excess Freight Rates Are Asked

Complaints aggregating $350,000 were filed in the Federal Building Apr. 28 with Examiner Edgar Watkins, of the Interstate Commerce Commission, by five coal companies of the eastern Pennsylvania district, which seeks to have refunded all freight rates paid in excess of $1.30 and $1.40 a ton on coal shipped since 1912.

The complaints were made by Meeker & Co., against the Central R.R. of New Jersey, the Plymouth Coal Co. against

the Pennsylvania R.R., G. B. Markle Co. against the Lehigh Valley R.R. and the Red Ash Coal Co. against the Central R.R. of New Jersey, and Weston, Dodson & Co. against the Central R.R. of New Jersey. Briefs will be filed June 1 and a decision is expected in July.

The five companies joined in 1912 in complaints to the Interstate Commerce Commission that the rates of these railroads on coal at $1.45 to $1.55, according to the grade, were excessive. The commission sustained their complaint and the rates were reduced to $1.30 and $1.40.

PENNSYLVANIA

Anthracite

Pittston—Several hundred mine workers from the Wyoming Valley are leaving for the bituminous coal regions, fearing a strike in the anthracite section. Some of the collieries are each several hundred men short.

Shamokin—Twelve hundred men were thrown out of work at the Susquehanna Coal Co.'s Cameron Colliery on Apr. 26, when two loaded cars running wild down the slope, badly wrecked it. A number of men had narrow escapes at the bottom of the slope.

Kingston—A meeting of the officials and representative employees of the Kingston Coal Co. was held in the main auditorium of the company on Apr. 27. An able lecture was given by Peter Roberts, secretary of the national Y. M. C. A. industrial department. Dr. Edwin Hogg, the company veterinarian, also gave a stereoptican lecture on the care of the mine mule. There were about 200 men present.

Coalport—The drainage tunnel between Nesquehoning and Coalport, a distance of three miles, which was constructed by the Lehigh Coal and Navigation Co., is completed. It drains all of the mines in the vicinity of Nesquehoning into the Lehigh River. The pumps have been removed from the mines, as they are no longer needed.

Hazleton—Judge Filler decided on Apr. 28 that the G. B. Markle Co. need not refer to arbitration the demand of the Union Improvement Co. for increased royalties on coal mined from the Ebervale tract. The land was leased in 1889 by the improvement company to the Markles. The contracts provided for arbitration in case of readjustment of royalties in the Mammoth Vein, but not in the others. The Mammoth is mined out and the improvement company loses the fight to readjust prices for coal taken from other workings.

Pottsville—An explosion of a big pocket of gas in the Eagle Hill Colliery on Apr. 29 endangered a number of workers. Two men, Peter Matlock and John Leo, were severely burned.

Bituminous

California—The Vesta Coal Co., a subsidiary of the Jones & Laughlin Steel Co., which has two of the largest mines in the world in operation at California and Fredericktown on the Monongahela River, is negotiating for the purchase of land for surface plant to open its coal holdings in the vicinity of Beallsville, Washington County. The company owns a large acreage between its river frontage and its holdings in the Beallsville field, which it is planned to develop, transporting the coal underground to the river front either at Vesta No. 4 mine at California or Vesta No. 5 at Fredericktown.

Robindale—Believing that work will be scarce for some time as a result of the recent explosion, many miners are removing their families from this town. The Conemaugh Smokeless Coal Co. will repair the mine as rapidly as possible, but it is likely that the plant will not be in operation at full for some time.

Cannonsburg—The Chartiers Creek Coal Co. recently posted notice that unless the miners who have been on strike return to work, they will be discharged and their places filled. The trouble at this mine began over the selection of a physician.

Connellsville—Shipments of coke from the Connellsville region recently amounted to 452,000 tons, while production was only 446,000 tons. The decline is due to an insufficient and indifferent labor supply and a slight falling off in the demand for furnace coke.

It has been stated throughout the coke region that the increase in wages recently announced by the United States Steel Corporation will not include employees of the H. C. Frick Coke Co. The statement from the New York office of the Steel corporation specified iron and steel workers. The coke workers recently received a substantial advance.

Washington—Fire which may possibly have been of incendiary origin recently destroyed the office building and filtration plant of the Richhill mine at Meadowland, owned and operated by the United Coal Co. The loss is estimated at $6,000; the tipple was saved by workmen.

WEST VIRGINIA

Matewan—Mine operators in this region are preparing for a record-breaking year in the output of coal. The opening of navigation on the Lakes has brought many miners to this county, they being attracted by the wages paid and other inducements. There is still, however, a continuous demand for more labor.

Thomas—The Thomas District Mining Institute recently held its first dinner and meeting. This organization was formed among the miners of the Davis Coal and Coke Co. for the purpose of promoting the safety and welfare of the mine workers.

Charleston—Officials of the new miners' union formed in the Cabin Creek and adjacent districts, following differences a few months ago with the United Mine Workers, announce that the union has been dissolved and that the men have returned to the general organization. The three-year agreement made by the secessionists has been accepted by the United Mine Workers.

Charleston—Mine-rescue car No. 8, in charge of Foreman Jesse Henson and a crew of trained men, is expected to make the following itinerary in West Virginia; Decota, Apr. 30 to May 6; Carbon, May 7 to May 13; Winifrede, May 13 to May 20. This car is one of the eight now in use by the Bureau of Mines for training men in first-aid and rescue methods and in the use of the oxygen breathing apparatus.

Carbon—The Carbon Republic and West Virginia Collieries Co., C. A. Cabell, vice-president and general manager, plans to build two community houses for its colored employees. One of these will be located at Carbon and the other at Wevaco.

Sharon—The Wyatt Coal Co., James Martin, general superintendent, has begun work on its new modern double tipple at Sharon.

Mullens—The Virginian R.R. has again put a corps of engineers at work surveying a route from this place down the Guyan River, presumably into the Logan County coal field.

Decota—Most of the mines in this region are needing more men. It is estimated that 300 miners could find employment with the companies in this section.

KENTUCKY

Sturgis—Store No. 1 of the West Kentucky Coal Co. has been destroyed by fire at a loss of $5,000, covered by insurance.

OHIO

Logan—Several of the largest coal mines in the Hocking Valley recently resumed operations following the signing of a new two-year agreement between the miners and operators. The new agreement will affect about 10,000 miners and provides for practically the same regulations as those now in force in the eastern Ohio district.

Martins Ferry—Seven mines were recently closed and 1,500 men rendered idle as the result of differences over the division of the increase granted by operators pending final agreement to be reached at a conference. Many of the other mines in the subdistrict were working, pending an adjustment of the difference in regard to this increase.

Maynard—The Troll mines, which were idle for more than a week, because the company would not haul the men into the mine, recently resumed operations. The miners' officials state that the men are being hauled to their work.

ILLINOIS

Pleasant Plains—Engine rooms of the mines of the Citizens' Coal Co. were stripped of brass a few nights ago. Steam cocks and other brass fittings were broken off and other articles of value were taken. Two men were arrested and identified as having been seen in the neighborhood in a buggy. Warrants have been issued.

Marion—The work at the Peabody mines is being rushed rapidly, and, although another month's work is ahead, it is expected that the mines will be able to start simultaneously, when the connection between the two is completed. In mine No. 2, which has been closed for some time, the light-weight tracks are being torn up and heavier steel substituted. It is believed that the connection between the two mines can be completed within a month.

Springfield—Although an agreement has not yet been reached by the Illinois operators and miners, a number of mines in central Illinois resumed operations May 1 and others are preparing to resume, pending a new state contract. The Springfield and Girard mines of the Montour Coal Co. began hoisting coal May 1, after being closed for 30 days, during which repairs were made. The mines employ about 600 men. officials say contracts in hand give promise of almost continu-

ous operation through the summer. The mines worked last year more than any others in the state. The Cora mine at Andrew and the Woodside mine of the Springfield District Coal Co. have also resumed.

WYOMING

Rock Springs—A force of men has been busy for some time unloading a new engine for No. 4 mine. The development work has been in progress for two years. For some time past the mine has produced a fair amount of coal, but it is the intention to make it produce 1,000 tons a day in the near future. Three entries have been opened, and 150 men will be employed when the mine is working full.

WASHINGTON

Seattle—The coal mines of the state are turning out more fuel than is usual for this time of year. After Apr. 1 the demand for coal usually falls off, but this year the consumption is greater than ever before. A majority of the mines in the district are working fairly good time, and only a few are working short hours. One new mine has been opened recently. This is the Grand Ridge near Issaquah.

PERSONALS

Arnold Hirst, of Conifer, Penn., superintendent for the Allegheny River Mining Co., recently removed to Kittanning, Penn.

E. A. Lassiter, of Mater, Ky., mine foreman of the Elkhorn Mining Co., has accepted a similar position from the Kentucky Block Coal Co., at Typo, Ky.

Gilbert Riggs is preparing to leave Palmerton, Penn., for Australia, where he will be employed in an official capacity by the British Government as a superintendent of coal mines.

George W. Goddard, of Arnold, Penn., assistant foreman for the Valley Camp Coal Co., has accepted the position of mine foreman for the Provident Coke and Mining Co., at Kelly Station, Penn.

E. F. Saxman, of Philadelphia, for some time vice-president and general manager of the Ebensburg Coal Co., at Colver, Penn., has resigned. Mr. Saxman has been a Pennsylvania coal operator for a number of years.

Frank Tirre, formerly of the Tirre Coal and Mining Co., latterly with the Lumaghi Coal Co., has been appointed assistant to General Manager John Schrader, of the Breese Coal and Mining Co.

George Maguire has been made Canadian representative of the Queen City Coal and Coke Co., of Buffalo, with office in Toronto. He has for some years traveled in Canada for the Pittsburgh Coal Co.

John Moulter, chief of the bureau of housing of the Pennsylvania Department of Health, is in the anthracite region checking building improvement. He is pursuing this work with the coöperation of the Delaware, Lackawanna & Western Coal Co., and the boards of health in the mining towns.

M. S. Peltier, who, for many years has been chief engineer of the Peabody interests at Chicago, Ill., has become president of the Monarch Coal Mining Co., of Monarch, Wyo. Mr. Peltier will continue to act as consulting engineer for the Peabody interests, and will maintain his office in Chicago.

Mo Si, a native Chinese, is gaining a practical knowledge of mining engineering with the Lehigh Valley Coal Co., at Centralia, Penn. He is a graduate of the Massachusetts Institute of Technology and Columbia University, and will return to China after completing his work in Pennsylvania coal mines.

Bruce Huffmaster, former secretary of the Pana subdistrict of the United Mine Workers, who was indicted in March, 1915, on the charge of embezzling $1,400 of the miners' funds, recently pleaded guilty to embezzling $200 and was paroled on his agreement to repay that amount in installments of $10 each.

"Uncle Bill" Combs, a negro more than 70 years old, who with his brother, Jack Combs, owned 700 acres of mineral land opposite Hazard and who recently sold the mineral to the Daniel Boone Coal Co. for $100 an acre, has been declared sane by a jury in the Perry County Circuit Court. Relatives had said he was incompetent to manage his estate.

James R. Barnett, lately appointed vice-president and general sales agent of the Allegheny River Mining Co., has taken offices on the fourth floor of the Marine National Bank Building, Buffalo, N. Y., and has engaged F. A. Mohr, an experienced office coal man, as chief clerk. Mr. Barnett was for several years connected with the office of the Shawmut Coal and Coke Co., which he now leaves.

OBITUARY

Carroll Moore, an expert on coal and coal traffic, died recently at his home in Yonkers, N. Y. He was 46 years of age and was connected with the Lehigh Coal and Navigation Co.

J. F. Roberts, of Reynoldsville, Penn., paymaster and treasurer for the Virginia Coal, Iron and Coke Co., at Inman, Va., was recently shot to death by a miner following a dispute as to the amount due the later for work in the company's mines.

Col. Charles E. Smith, capitalist and dealer in coal and timber properties, died suddenly at his home in Winchester, Ky., recently at the age of 65. Mrs. Smith, a son and a daughter survive him.

John G. Moffat, 81 years of age, a resident of Dunmore, Penn., for the past 46 years, died recently at his home after an illness of several weeks, due to the infirmities of age. Mr. Moffat was born in Scotland in 1835. In 1870 he came to the United States, settling in Dunmore, where he became an employee of the Pennsylvania Coal Co. Until his retirement from active duties he was in charge of the mines at Dunmore. Mr. Moffat is survived by one sister, six daughters and three sons.

TRADE CATALOGS

Link-Belt Co., Chicago, Ill. Booklet No. 238. "Grab Buckets." Illustrated, 12 pp., 3½x6 in.

Huntington Lumber and Supply Co., Huntington, W. Va. Catalog No. 101, "Minter Homes." Illustrated, 128 pp., 8x10 in.

Scranton Pump Co., Scranton, Penn. Bulletin No. 107. "Scranton Triplex Plunger Pumps." Illustrated, 12 pp., 6x9 in.

National Transit Pump and Machine Co., Oil City, Penn. Bulletin No. 302. "Power Pumps." Illustrated, 16 pp., 6x9 in.

Redwood Manufacturers Co., San Francisco, Calif. Catalog VII. "Remco Redwood Pipe." Illustrated, 110 pp., 6x9 in.

Nelson Valve Co., Chestnut Hill, Philadelphia, Penn. Pamphlet. "Extra Heavy Steel Gate Valves." Illustrated, 24 pp., 5x7½ in.

National Tube Co., Pittsburgh, Penn. Bulletin No. 26. "Autogenous Welding of 'National' Pipe." Illustrated, 52 pp., 8½x 11 in.

Raymond Bros. Impact Pulverizer Co., Chicago, Ill. Catalog No. 12. "Grinding, Pulverizing and Air Separating Machinery." Illustrated, 64 pp., 8x10½ in.

The Deming Pump Co., Salem, Ohio. "Deming Pumps for Hand and Power." Catalog No. 25. A cloth-bound volume of 358 pp., 6x9½ in., profusely illustrated.

The Electric Service Supplies Co., Philadelphia, Chicago, New York. Catalog No. 5. "Mine and Industrial Supplies." Bound volume of 408 pp. 6x9 in. profusely illustrated.

The Ohio Brass Co., Mansfield, Ohio. Catalog No. 16. "Overhead Material, Rail Bonds, Car Equipment Specialties, and High-Tension Porcelain Insulators." Illustrated. Cloth-bound volume of 654 pp., 6x9 in.

Ingersoll-Rand Co., 11 Broadway, New York. Form No. 3029. "Ingersoll-Rogler Class ORC Duplex Corliss Steam Driven Air Compressors." Illustrated, 32 pp., 6x9 in. Form No. 3036. "Turbo Blowers." Illustrated, 10 pp., 6x9 in. Form No. 4120. "Leyner-Ingersoll Water Drills." Illustrated, 44 pp., 6x9 in.

COAL AND COKE PATENTS

Means for Handling Coal. C. S. Williamson, Chicago, Ill. 1,177,751 Apr. 4, 1916. Filed Aug. 9, 1911. Serial No. 643,192.

Process of Treating Coal. C. H. Smith, Short Hills, N. J. 1,177,727 Apr. 4, 1916. Filed Sept. 18, 1915. Serial No. 51,351.

Miner's Drill. C. F. Lindenmuth and R. A. Hanley, Aristes, Penn. 1,178,402 Apr. 4, 1916. Filed Sept. 11, 1915. Serial No. 50,241.

Furnace Charging Mechanism. A. C. Nelson, Lakewood, N. J. 1,177,720 Apr. 4, 1916. Filed Sept. 17, 1915. Serial No. 51,198.

Steam Boiler Flue Cleaning Apparatus. T. Gruenwald, Genoa, Italy. 1,178,316 Apr. 4, 1916. Filed Dec. 22, 1914. Serial No. 878,612.

INDUSTRIAL NEWS

Philadelphia, Penn.—F. R. Wadleigh announces the removal of his office to No. 1418 Walnut St., Bellevue Court Building, Philadelphia, Penn.

Boston, Mass.—The four-masted schooner "Horatio A. Stone" has been chartered to carry a cargo of coal from Norfolk to Pernambuco. The freight rate is $19 per ton and the charter represents about $38,000.

Philadelphia, Penn.—The Emmons Coal Mining Co., owing to the increase in business, has enlarged its quarters in the Land Title Building by the addition of another room. The clerical force is also to be increased in the near future.

Bristol, Tenn.—By compromise of their suit against the Clinchfield Coal Corporation, the heirs of Capt. R. H. Imboden, of Bristol, are to receive more than $100,000 in cash. Title to large holdings in Russell County, Va., was involved in the suit.

Buffalo, N. Y.—The Delaware, Lackawanna & Western Coal Co. has arranged to ship Lake coal from the docks of the Susquehanna Coal Co., at Erie, Penn., so far as it is in excess of dock facilities here. The new dock of the company here is to be completed about August.

Ottawa, W. Va.—The Monte Coal Co. and Big Eagle Mining Co., operating mines at Ottawa, Boone County, W. Va., voluntarily gave a 5 per cent. increase in wages, this becoming effective May 1. This it is said will be the highest rate paid in any of the splint and gas mines in the state.

Louisville, Ky.—The Continental Coal Corporation has announced that it has closed contracts for coal to be delivered from its Bell County mines to Ohio, Indiana, Michigan and Lake points calling for 65,000 tons of domestic and 80,000 tons of steam fuel. Shipments are to be made inside of six months.

Dupont, Penn.—The Hillside Coal and Iron Co. has filed an injunction suit against Victor Werpelowski to restrain him from bringing suit in the Supreme Court of New York and to compel a trial of the case in the courts of Pennsylvania. Mr. Werpelowski was injured by a blast in the Butler mine in November, 1915, and charges the company officials with negligence.

Issaquah, Wash.—A receiver has been appointed by the Superior Court for the Issaquah & Superior Coal Mining Co., which was recently taken over by the Northern Savings Bank and Trust Co. under mortgage foreclosure. The appointment of a receiver is intended primarily to hasten the reorganization before the bond redemption period expires in March of next year.

Lexington—At a meeting of the creditors of the Wolfe Valley Coal Co. the sale of the property near Jackson, Ky., was ratified so far as the sale of part of the property to the H. F. Davis Co. was concerned. A parcel of land for which a bid of $9,000 was made, will be held. It is stated that the company expended $100,000 on development work before going into bankruptcy.

Jellico, Tenn.—The equipment for the new mine-rescue station at this place is being removed from the Federal Building in Knoxville to the second floor of the post office building in Jellico. The new headquarters are considered a more central location for Tennessee, southwest Virginia, West Virginia and southeast Kentucky. J. M. Webb will be in charge of the station.

Louisville, Ky.—The Illinois Central R.R. has announced the raising of its embargo on shipments for delivery to points east of the western terminals of the Eastern trunk lines. The company will now receive any shipments subject to existing embargoes on Eastern lines. The Louisville & Nashville R.R., which has announced an embargo, has made no changes in its original rulings.

Princeton, W. Va.—According to tidewater reports, coal barges were recently unable to make a landing at the piers because of storms and as a result 4,675 carloads of coal blocked the sidings of the Virginian R.R. The coal fields along the Virginian are running to capacity, it is reported, while the supply of bottoms meets the demand except for the condition of water preventing landing.

Johnstown, Penn.—The Baltimore & Ohio R.R. is taking steps toward relieving the car situation on that road. Orders for steel cars are now being filled and the Cambria Steel Co. alone is manufacturing 25 cars a day. These cars are steel gondolas and are distributed over all sections of the road wherever they are most needed. The steel company makes about two deliveries a week, each containing 100 cars.

Mentor, Ohio—Considerable activity in shipbuilding has developed at this port recently, indicating an active demand for charters. During the past week the Lake Transportation Co. has incorporated with an authorized capital of $300,000 for the purpose of building and operating Lake freighters. Mark A. Copeland, Charles A. Alexander and others are the backers. Several other large boat concerns have been organized recently.

Milwaukee, Wis.—In connection with a plan to utilize garbage, a method is being considered which was submitted by the American Gas and Incinerator Co., which has patented a process to manufacture gas, coke and tar from refuse. The garbage is treated by chemicals and it is reported that a long ton of this material will produce 1,200 cu.ft. of gas, 10 gal. of tar and 250 to 300 lb. of coke. The process is claimed to be smokeless and dustless.

Connellsville, Penn.—It is reported that a new use for coke is to be developed in New England. It is believed that greater fuel economy can be secured by heating with this fuel. The Boston & Maine R.R. is preparing to introduce coke in all its stations, shops, section houses and other buildings. Contracts are understood to have been let for large quantities of this fuel. Special instructors will travel over the railroad system instructing the employees in the use of coke.

Philadelphia, Penn.—The City of Philadelphia has arranged to commence at once the deepening of the water for one-half mile in front of the Port Richmond coal piers from 28 to 30 ft. and extending out into the river to the 35-ft. channel. This will then make it possible for vessels of larger draft to load at the piers. The work has been taken in hand by the city, owing to the Federal Government having neglected the operation in the appropriation for harbor work in this district.

New York, N. Y.—At the annual election of the Maryland Coal Co., of West Virginia, held recently at the New York office of the company, Harold S. Dickson, J. W. Galloway, George Hewlett, K. A. Knickerbacker, John T. Manson, C. L. F. Robinson and William H. VanKleeck, were elected to the board of directors. This insures the reëlection of J. W. Galloway, president, George Hewlett, vice-president, James P. Russell, secretary and treasurer, and J. E. McGowan, assistant secretary and treasurer.

Canton, Ohio—A strike at the Bergholtz and Amsterdam coal mines, in Jefferson County, throwing 1,000 men out of work, is reported here, affecting the local supply materially. A difference between the loaders and cutters at the mine is reported to be responsible for the trouble, the operators not being affected. The loaders and cutters have been unable to agree on the division of the scale. It is reported that men in many other mines have had similar differences, resulting in widespread idleness in eastern Ohio.

Beallsville, Penn.—A controversy which recently arose between Beallsville and Scenery Hill, neighboring mining towns in eastern Washington County, as to the number of motorcars owned in each, has brought to light the fact that these two little mining towns have perhaps the greatest number of automobiles, in proportion to population, of any towns in the state. These towns, of about 700 population each, show bank deposits of approximately a half million dollars, the deposits per capita being among the largest for any communities in the Commonwealth.

St. Louis, Mo.—Plans for the standardization of river terminals, to facilitate handling of coal and other freight, are contained in the report of the committee of engineers of the Mississippi Valley Terminal League, which has just been issued by Chairman E. J. Spencer, of St. Louis. The purposes sought are the revival of river traffic, provision of warehouse space for boats and shippers, securing the lowest possible terminal cost and extending the benefits of cheaper water rates. The report will be published in book form and will be circulated among commercial clubs and municipal officials of cities and towns on the inland waterways system.

New York, N. Y.—The Worthington Pump and Machinery Corporation recently took over all the properties and assets of the International Steam Pump Co., the Snow Steam Pump Plant at Buffalo, N. Y., the Dean Steam Pump Plant at Holyoke, Mass., the Laidlaw-Dunn-Gordon plant at Cincinnati, Ohio, the Blake & Knowles Steam Pump Works at East Cambridge, Mass., the Power and Mining Machinery Co., at Cudahy, Wis., International Gas Engine Co., Cudahy, Wis., the Fred M. Prescott Steam Pump Co., Milwaukee, Wis., Jeanesville Iron Works Co., at Hazleton, Penn., and will also act as sales agent for Henry R. Worthington, whose operation will be under the direction of the Worthington Pump and Machinery Corporation.

Market Department

General Review

Anthracite wage agreement causes a sharp reaction. Bituminous also weaker. Lake trade fails to absorb the expected tonnage. Labor shortage a dominating factor in the situation. Urgent demand for screenings in the Middle West but market otherwise flat.

Anthracite—The sharp flurry of last week, on the announcement of a deadlock at the anthracite wage conference, was succeeded by a complete reaction when an agreement was finally reached this week. Heavy cancellations were the rule though these did not attain to the proportions that might have been expected under the conditions. Prices are so far holding firm, but if the customary summer dullness appears, price cutting will undoubtedly be resorted to along the usual lines. From present indications the April tonnage will show a very heavy decline from the average for this month, which is usually one of the most active of the year. The fixing of the wage agreement relieved the heavy pressure for coal at down East points, though the demand is still insistent. Not much coal has gone to the Lakes, pending the final arrangement of the wage scale and the Middle Western market has been marking time for the same reason, but will see an active demand from now on.

Bituminous—The current market is distinctly weaker. Lake trade has failed to absorb the expected volume of West Virginia coal, in addition to which the bituminous market has shown a tendency to react in sympathy with the anthracite trade when the labor controversy in that branch was settled. Even at points where embargoes have been in effect, consumers now seem to have adequate supplies with the possible exception of in certain limited grades. There are still many large steam contracts to be concluded on which the buyers are waiting for lower figures though with the impending wage advances, it is highly doubtful if anything less than the ruling figures will be offered this season. One of the strongest constructive factors in the present situation is the inadequate labor supply which has attained to such proportions that it will be difficult to meet any broad expansion in the consumption. This phase of the situation is regarded so serious that many of the sales agencies are dispatching representatives to the mining regions to make personal investigations as to the outlook.

Lake Shipments—Lake shipments to date have proved a disappointment due to the late opening and to the fact that so many boats are going up light in order to expedite the movement of iron ore. Indications are that vessels available for coal shipping will be even less as the season advances, particularly for delivery to Lake Michigan ports. The inadequate car supply is still occasioning annoying delays, and indications point to difficulties in this respect throughout the season. Contract prices continue to rule substantially above the figures of last year. The arrangement of the Hocking Valley wage scale has started negotiations on contracts there, several large railroad tonnages having already been covered and others still pending. The general market is rather mixed and much disturbed and unsettled by the threatened scarcity of labor.

Middle West—A spurt of activity in contracting and a very urgent demand for screenings are the chief constructive factors in an otherwise generally dull market. The demand for screenings is so insistent that many mines are working their crushing plants up to full capacity and prices are strong. The labor supply promises to become a serious problem, and the uncertainties in this line are causing no little anxiety among the consuming interests with the result that many of them are seeking to cover their requirements. On the other hand the retailers are holding off in expectation of better prices later, and this in spite of the fact that their stocks are practically all cleaned up. Reports from the West and Northwest indicate early buying from the dealer trade in that direction, some slight increases already being noted.

A Year Ago—Anthracite buyers less responsive as the season advances and some accumulations are noted. Heavy increase in export shipments creates a better tone in the Eastern bituminous market. Situation at interior points continues dull and discouraging. Pessimistic outlook in the Lake trade.

Business Opinions

Boston News Bureau—The situation is a most peculiar one. Financially we are awaiting the Kaiser's reply. Commercially we are awaiting a settlement of the labor troubles. General conditions maintain a wonderful front considering the uncertainties that are operating. There is no doubt but that the country is feeling the effects of a remarkable period of prosperity. The question comes as to whether we are at the zenith of this prosperity. This depends, of course, largely on the duration of the European War. But there is nothing in sight to warrant the opinion that peace is in the immediate future. More important, perhaps, will be our ability to maintain our neutral position. One factor which is probably more influential than is generally admitted, is that the republican national convention is only about five weeks away.

Iron Age—Labor troubles have been rampant this week in portions of the steel and metal working trades. These and the strikes previously under way have cut down steel consumption somewhat, and in a less degree the output of mills. At Pittsburgh the rioting originated outside of steel plants and the temporary shutdowns of the latter were precautionary. Iron and steel manufacturers were forehanded in advancing wages and the May outbreaks have affected them less than was feared. No relief from the pressure upon the mills is in sight, but new buying is less and the question at what prices future contracts should be made is exercising certain large interests, buyers of war steel in particular.

Bradstreet—Country-wide activity in wholesale as well as in jobbing lines continues, the international political situation is deemed to be less serious, overwhelming activity is the dominant feature of leading industries and there are comparatively few signs of any material let-up in either industrial or commercial channels. On the other hand, retail trade over a large area has been blocked from fullest developments by cool or wet weather, labor is plainly restless, high prices for staple manufactured commodities tend to produce more or less complaint of the reduced purchasing power of the dollar, and there is some question about the extent of speculative buying. However, substantial achieved actualities heavily outweigh any doubts that are abroad.

Dun—The best previous records of production and distribution, of earnings and wages, are steadily surpassed. Even after great expansion, legitimate enterprise shows continued augmentation, though various influences combine to hinder its growth. Consumptive requirements, however, are sustained in unprecedented volume, and industrial facilities, while constantly improved and increased, are inadequate to handle all the work there is to be done. Commercial failures this week in the United States are 336 against 333 last week, 361 the preceding week and 447 the corresponding week last year.

Dry Goods Economist—Though it is still unequal to the demand, there are indications that the supply of merchandise is expanding. Little, if anything, is now heard of the scarcity of dyestuffs, the sellers emphasizing rather the scarcity of labor and the higher wages either paid or demanded. Various bleacheries, however, are reported to be running three shifts per day of 24 hr. Added to the increased output is the slackening of purchases by retailers usual upon the close of the Easter trade. Unfavorable weather throughout a great section of the country has also checked the demand at retail.

Marshall Field & Co.—Wholesale shipments of dry goods for the week are much larger than for the corresponding period of a year ago. Road sales for immediate delivery are considerably greater than for the same period last year, and are continuing strong for fall delivery. More customers have visited the market than during the same week last year. Collections are normal. Prices on domestic cotton goods are firm.

American Wool and Cotton Reporter—Fine wools are in considerable demand, and, according to one dealer all the world is running to fine wool. Fine scoured free wools are very scarce and are much sought after. More inquiries have been made for scoured wools and there has been more activity in them. The new clip from the West is of great interest at present. Some of it has been sold in the Boston market and a fairly satisfactory business has been transacted on original wools.

ATLANTIC SEABOARD

BOSTON

Hampton Roads coals again accumulate and slightly easier prices are the result. Georges Creek unchanged. Pennsylvania grades offering a little more freely, but shortage of men is restricting output. Anthracite situation clearing up.

Bituminous—Contrary to general expectation this week has developed an easier situation at Hampton Roads. Receipts of Pocahontas and New River at the piers are again in excess of bottoms available for loading and in spite of a fairly steady market for Lake shipment there are likely to be heavy accumulations at Tidewater the next few weeks. Prices are a shade less firm in consequence, concessions being made from the $2.85 price for business that will release cars promptly. The railroads are keeping in close touch with the coal agencies in order to avoid prolonged detention of cars at the loading ports.

A slackening tendency is also noted in the contract demand in New England. Cargoes that have come forward the past fortnight have met unusual delays at points like New Haven and Providence, and demurrage is so drastic that there is small encouragement for speculation. Spot sales are getting fewer as the season advances, and as the all-rail movement improves. The better prospect for settled weather is no small factor also, and there is further a distinct reaction against the recent tendency of all-rail buyers to seek supplies at Tidewater.

Although Georges Creek is also in better supply than a fortnight ago there can hardly be said to be a surplus. Receipts in this market are small but they have no appreciable effect on the situation. All-rail deliveries of this grade are just beginning to come through. Coastwise movement has been considerably hampered by the prolonged easterly weather and the contract demand on these shippers is still strong.

With the new wage scale in effect in Central Pennsylvania most of the difficulties, aside from a shortage of men, are gradually being ironed out. For the quality grades there is an ample market at the iron and steel works more accessible to the mines, and unless output is materially increased the factories in New England are not likely to figure very largely in this business. The coals of medium grade are being freely offered for such points all-rail as are now open to shipment and at New York and Philadelphia in increasing volume. High marine freights, however, continue a retarding influence and one that is likely to prove serious for New England. Practically all the operators are disturbed over the uncertainty of production during the next few months. Efforts are being made to secure men, but since about the same situation prevails in all the districts it is hard to see how they can be successful to any degree.

Anthracite—Optimistic reports early in the week indicated a settlement of the wage controversy and retail dealers here are much relieved over the clearer outlook. There is still an insistent demand at most points on Tidewater, although the pressure will be much less than if a strike were still a possibility. It remains only to see what will be the new circular prices before the Eastern market will settle down to something like a normal May trade. Of course the dealers in the larger cities have taken on what coal they could get the past month and stocks are heavier than they are ordinarily on Apr. 1. But in most other places only scattering cargoes have been received and barges are in short enough supply so that demand is counted on to be steady at least until July 15.

Bituminous at wholesale, f.o.b. loading ports at points designated, is quoted about as follows:

	Philadelphia	New York	Baltimore	F.o.b. Mine
Clearfields	$2.65@3.10	$2.95@3.40	.....	$1.35@1.75
Cambrias and Somersets	3.00@3.30	3.30@3.60	.....	1.75@2.05
Georges Creek (contract)	3.07@3.17	3.37@3.47	$3.00@3.10	$2.00@2.10

Pocahontas and New River are quoted at $2.80@2.85 f.o.b. Norfolk and Newport News, Va., and $5.00@5.35 on cars Providence or Boston.

NEW YORK

Anthracite market normal following flurry over strike talk. Orders cancelled. Coal scarce owing to light production and scarcity of miners. Soft-coal situation dull. Labor trouble in central Pennsylvania. Speculators lose money.

Anthracite—With the drawing up of the tentative agreement between the anthracite operators and miners the hard-coal market has become normal. There was a decided flurry following the announcement that the conferees could not agree and many orders were placed for prompt delivery. Several operators also took steps to conserve their supplies and at least one of the companies stopped taking orders, but when it was announced that the demands had been referred back to the subcommittee, this order was countermanded. Buying continued brisk until Monday when it became known that an agreement had been reached.

Production is being continued on about a half-time basis and labor is becoming a serious problem. Reports from the coal regions say that during the past couple of weeks many miners have gone to the soft-coal regions where the prospect of steady employment is better.

The hope of the dealers that they will be able to buy coal cheaper than at the present winter circular promises to be shattered. It was announced on Monday that there would be an increase in the price of the domestic sizes to cover wage advances, but nothing was said regarding a possible reduction during the spring and summer months.

The tonnage received at Tidewater is sufficient to meet all immediate needs. Prices are firm at winter circular, except in isolated cases where individuals have considerable free coal. The call for the steam coals is slowing up. Good grades of buckwheat are reported scarce. Some dealers who held some of this coal in reserve in anticipation of high prices were in a hurry to dispose of their holdings early in the week.

Current quotations, per gross ton, f.o.b. tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$5.05	.....	Pea	$3.50	$3.40@3.55
Egg	5.30	$5.30@5.30	Buck	2.75	2.60@2.75
Stove	5.30	5.30@5.30	Rice	2.25	2.05@2.25
Nut	5.55	5.55@5.55	Barley	1.75	1.60@1.75

Quotations at the upper ports are generally 5c. higher on account of the difference in water freight rates.

Bituminous—The bituminous market which stiffened up at the prospects of a strike in the anthracite region has become stagnant again. Orders are scarce and prices have declined from last week's basis. There is plenty of coal everywhere to meet all the demand, notwithstanding the many embargoes in force. Additional embargoes have been placed against New England deliveries on bituminous and anthracite coals during the past ten days. Production shows no improvement, although some operators with contracts are anxious to do better.

Reports from the Clearfield and Somerset fields regarding labor disturbances are frequent and several New York houses with mining interests have their representatives on the ground. A close watch is being kept on the situation. It was reported that some operators have withdrawn their quotations to middle houses for fear of serious trouble.

Line demand is good but there is much territory that is in the embargo zone, where shipments are restricted.

Current quotations, per gross ton, f.o.b. Tidewater, follow:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$3.55@3.75	$3.55@3.75	$3.55@3.75	$2.00@2.20
Georges Creek Tyson	3.30@3.45	3.30@3.45	3.30@3.45	1.75@1.90
Clearfield: Medium	3.10@3.20	3.10@3.20	.....	1.55@1.65
South Forks	3.20@3.35	.....	.....	1.65@1.80
Nanty Glo	3.10@3.25	.....	.....	1.55@1.70
Somerset County: Medium	3.00@3.10	3.00@3.10	3.00@3.10	1.45@1.55
Quemahoning	.....	3.15@3.25	.....	1.60@1.70
West Virginia Fairmont	.....	2.70@2.80	.....	1.00@1.10
Fairmont mine run	.....	2.70@2.80	.....	1.00@1.10
Western Maryland	.....	2.60@2.75	.....	1.10@1.20

PHILADELPHIA

Anthracite trade pleased at settlement. Great interest in new circular. Contract prices not yet announced. Falling off in demand for steam sizes. Collections good. Bituminous dull. Better tide business.

Anthracite—Now that a wage agreement has been reached and the tension relieved the trade is ready to negotiate business. The news gives general satisfaction.

The immediate effect of the new wage agreement was a large number of cancellations; orders entered the previous week were extremely heavy due to the very unfavorable news concerning the deliberations between the operators and miners at that time. However, heavy shipments had already been made on these orders and the wholesale interests enjoyed two days of very remarkable business. Dealers who the day before refused to buy, claiming they had no room for coal, suddenly decided they must have immediate shipments of all sizes. The following day when an adjustment seemed likely there was a reaction. New business fell off sharply, though cancellations were much fewer than might have been expected. The boom found the shippers unprepared and almost a day was lost before active shipping commenced.

The first week in May finds the yards again stocked to capacity, as on Apr. 1. The demand on the retailers has been

brisk, but the purchases were far in excess of the sales, so much so in fact that more than one had demurrage charges accrue before the cars could be unloaded.

There has been a sudden improvement in collections. Buyers who had been neglecting their obligations seemed to realize it was wise to give their bills attention when asking for quick movement on new orders.

The April tonnage shows a marked deficiency as compared with the same period a year ago, but the shipments during the last week of the month added quite a little to the aggregate.

The prices per gross ton at mines for line shipment and f.o.b. at Port Richmond for tide shipment for the past week have been as follows:

	Line	Tide		Line	Tide
Broken	$3.60	$4.85	Pea	$2.55	$3.30
Egg	3.85	5.10	Buckwheat	1.55	2.30
Stove	4.10	5.10	Rice	.90	1.80
Chestnut	4.25	5.35	Barley	.55	1.30

Bituminous—The trade is dull and new orders are very scarce. Embargoes outside the city continue without change beyond an occasional lifting for a day or two at a time, while in the city proper local buyers show very little inclination to increase their stocks. It is a remarkable fact that prices hold as well as they do, as the changes have really been very immaterial. There were a few slight declines on the announcement of a settlement of the anthracite labor difficulties.

There are at this time a large number of manufacturing plants usually under contract who have not as yet closed, and are waiting for lower figures. The shippers on the other hand insist that with increased costs now is the time to contract, as prices cannot well go lower. The shortage of labor is also rapidly becoming a factor and the moment the demand for fuel strengthens, prices will react to a higher level.

A feature of the trade at present is the activity in ocean charters, especially for shipments to South America, all of which have been taken at high rates. The European business is at a standstill. Prices per gross ton f.o.b. cars at mines are as follows:

Georges Creek Big Vein	$1.90@2.00	Fairmont gas, ¾	$1.50@1.60
South Fork Miller Vein	1.75@1.85	Fairmont gas, mine-run	1.35@1.45
Clearfield (ordinary)	1.45@1.55	Fairmont gas, slack	.95@1.00
Somerset (ordinary)	1.30@1.45	Fairmont lump, ordinary	1.10@1.20
West Va. Freeport	1.20@1.30	Fairmont mine-run	.95@1.05
		Fairmont slack	.95@1.00

BALTIMORE

Anthracite business at a standstill pending announcement of a new price list. Soft coal congestion follows poor demand. Prices hold fairly well, especially on contract.

The demand for soft coal is poor and consumers seem to be pretty well stocked up. Reduction orders on contract are frequent. There is much congestion at the mines, and at switching points and terminals. The congestion at Locust Point here caused an embargo against coal to that point the early part of the present week. Prices are holding fair considering conditions. Mine interests are refusing to cut contract quotations for delivery over any considerable period. Prices to the trade at the mines average about as follows: Georges Creek Tyson, $1.65; Miller vein, $1.50; Quemahoning, $1.60; Somerset, $1.30; Freeport, $1.10; Fairmont gas, three-quarter, 80 to 85c.; same, run-mine, 75 to 80c.; slack, 85c.

HAMPTON ROADS

Movement of coal to foreign ports continues heavy. Total dumpings both coastwise and foreign for month of April 1,353,235 tons.

Export shipments from Hampton Roads for the week have shown up well and there has been a fair amount moving coastwise in addition to coal taken by the Government. Coastwise shipments as usual were heaviest to Boston and Providence with other cargoes to Portland, Pawtucket, Lynn, West Lynn and Jacksonville. This coastwise coal has consisted of Pocahontas and New River, and a fair amount of high volatile. The export cargoes were almost entirely Pocahontas and New River.

The total dumpings for the month of April amounted to 1,353,235 tons or about 40,000 below the March figures. Of the total movement the Norfolk & Western dumped 679,864 tons, the C. & O. 380,413 tons and the Virginian 292,958 tons. The Norfolk & Western has again dumped more coal than the other two roads combined by about 6,000 tons.

Railroad Tonnages—Dumpings over the local piers for the past five weeks compare as follows:

	Week Ending				
Railroad	Apr. 1	Apr. 8	Apr. 15	Apr. 22	Apr. 29
Norfolk & Western	145,941	144,562	182,621	140,327	169,430
Chesapeake & Ohio	98,495	90,981	85,973	95,838	94,525
Virginian	65,026	74,198	83,228	59,157	.....
Totals	309,462	309,741	351,822	295,322	.....

Ocean Charters and Freights

COASTWISE FREIGHTS

There is no material change in rates from Hampton Roads to Boston, $2.35 being about the average rate, with $2@2.15 the rate to points like Providence and New Bedford. There is some re-chartering on the part of coal factors who find their output a little less in demand and do not care to risk demurrage and other losses. The seamen's demands are causing transportation owners a lot of annoyance, and there have been several instances of boats being tied up at this end for days at a time.

From New York barge rates to Sound ports reacted from 80c.@$1 on the anthracite strike talk of last week, but they are expected to recede.

VESSEL CLEARANCES

The following steamers have cleared from various ports:

NORFOLK

Vessel	Destination	Tons
Kronburg[4]	St. Lucia	5,174
Trento[12]	Savona	4,477
Taquary[12]	Rio	1,918
Rosemount[6]	Kingston	1,511
Skomvaer[7]	Buenos Aires	2,642
Nicolo[12]	Porto Ferrajo	6,553
Belmont	Buenos Aires	2,216
Rebecca R. Douglas	Kingston	511
Wm. E. Litchfield[4]	St. Georges	774
Skogstad[6]	St. Lucia	5,573
D. N. Luckenbach[6]	Rio	3,529
Erissos[3]	Rosario	4,056
Withersfield[4]	Vera Cruz	1,883
Angelo Parodi[12]	Genoa	5,311
Panama Transport[4]	Havana	7,378
Geo. M. Embiricos[13]	Piraeus	4,129
Matoa[5]	Santiago	2,736
Finland[13]	Rio	....
Horatio G. Foss[13]	Para	1,225
Wm. C. May	Bahia	1,084
Teresa Accam[12]	Genoa	6,314

NORFOLK—Continued

Vessel	Destination	Tons
Bergenhuus[12]	Savona	5,404
Italia[12]	Genoa	4,499
Giovanni[12]	Gibraltar	....
Doris[12]	Gibraltar	....

NEWPORT NEWS

J. Van Nassau[15]	Buenos Aires	4,000
Honduras[4]	Havana	2,773
Ioannis[4]		4,300
Carmen[14]		7,144
Van L. Black[7]	Para	840
Joanna[4]	Puerto Militar	....
Maletta[7]	Buenos Aires	....
Uranus[16]	Gibraltar	....

BALTIMORE

Isthmian	Argentina	6,764
Franklin	Egypt	6,349
Glenfric	Argentina	5,710
Davenport	Argentina	1,791

PHILADELPHIA

Ruth B. Cobb	Manzanillo	530
M. E. Harper	Antilla	
Nicholas	Gibara	
Ulrik Holm	Havana	930
Jose	Santa Marta	

[1] Atwater & Co.
[2] Baker Whiteley
[3] Barber & Co.
[4] Berwind-White
[5] C. G. Blake Co.
[6] Castner, Curran & Bullitt
[7] Chesapeake & Ohio C. & C. Co.
[8] Crozer-Pocahontas Co.
[9] Hasler Brothers
[10] Flat Top Fuel Co.
[11] New River Coal Co.
[12] Pocahontas Fuel Co.
[13] Smokeless Fuel Co.
[14] C. H. Sprague & Son
[15] Maryland C. & C. Co.
[16] White Oak Coal Co.

OCEAN FREIGHTS

Freight market conditions are practically the same as a week ago. Three steamers were chartered during this period to take coal to Rio, two of them at $19.50 and the other at $19 net. A steamer was chartered for coal to Lower Plate port at $20.40, and two steamers, one for coal at $17, and the other for coal at $16.50 and coke at $25 to Chile.

We would quote freight rates on coal by steamer as follows:

To	Rate	To	Rate
Havana	$4.50@5.00	Bermuda	$5.00@6.00
Cardenas or Sagua	6.25 about	Vera Cruz	6.25 about
Cienfuegos	6.00@6.50	Tampico	6.25 about
Port au Spain, Trinidad	7.25 about	Rio Janeiro	[4]19.00@19.50
St. Lucia	7.25 about	Santos*	[4]19.50@20.00
St. Thomas	6.50@7.00	Montevideo	20.40 about
Barbados	7.25 about	BuenosAires orLaPlata	20.40 about
Kingston	7.00 about	Rosario	20.40@21.60
Curacao	6.75@7.00[3]	West Coast of Italy	31.20 about
Santiago	6.50@7.00	Barcelona**	30.00 about
Guantanamo	6.50@7.00	Valparaiso or Callao	17.00 about
Demerara	.....	Marseilles	30.00 about

* Consignees paying dockage dues. ** Spanish dues for account of cargo.
[1] 500 tons discharge. [2] 400 tons discharge. [3] And p.c. [4] Net, 1,000 tons discharge. [5] Or other good Spanish port.
W. W. Battie & Co.'s Coal Trade Freight Report.

OCEAN CHARTERS

Coal freight charters have been reported as follows:

ATLANTIC RANGE

Vessel	Destination	Tons	Rate
Trecarne	Plate	2,679	$20.40
	VIRGINIA		
Kalibia[3]	Chile	3,149	$17.04
Skogstad	St. Lucia	2,357	
Luckenbach	Rio	1,851	
G. G. Deering	Pernambuco	1,714	
American	Rio	3,643	19.00
Iowan	Rio	4,064	
Hilston	La Plata	1,897	
Torsdal[4]	Rio	2,299	22.80
Ugland[4]	B. Aires	1,230	[5]18.00
Agoustis	Plate	2,096	20.40

BALTIMORE

Vessel	Destination	Tons	Rate
Frankby	W. Coast So. Amer.	2,618	$17.04
Dansborg	River Plate	1,389	
Glenafric[2]	B. Aires	2,658	24.00
St. Theodore	Genoa		
	PHILADELPHIA		
V. C. Records	Jucaro	263	
Ermine	Bermuda	348	
A. F. Conlon	Ponce	515	
F. C. Bowen	Martinique	892	
M. M. Ford	Porto Rico	291	$16.00
M.M. Gruener	Ponce	599	[1]6.00
Montoso	San Juan	4,000	
W. Abrahams	Surinam	676	12.00

[1] And port charges. [2] Corrected. [3] Two ports. [4] May-June. [5] At or about.

Additional steamers have been offered on these terms.

LAKE MARKETS

PITTSBURGH

Striking miners return to work. Lake shipments unsatisfactory thus far. Market not strong.

The striking miners of the Pittsburgh, Carnegie and Westmoreland coal companies returned to work Friday and Saturday of last week, an agreement having been reached on the points at issue when the men struck at the beginning of the week. In some quarters it is suggested the misunderstanding was due to a desire to restrict the production of coal for a few days, as the market had become rather soft.

Shipments of Lake coal are decidedly lighter than was expected for this date. The navigation season was a few days late opening and so many boats are going up light, in order to increase the movement of ore, that there is no opportunity to move a large tonnage of coal. Cars have not been overplentiful. In some quarters a rather serious railroad congestion is expected as the season advances, sufficient to curtail materially the movement of both ore and coal as compared with estimates made as to the tonnage that ought to be moved.

The local market is not over-strong. We quote prompt coal as follows: Slack, $1@1.10; mine-run, $1.20@1.30; ¾-in., $1.30@1.40; 1¼-in., $1.40@1.50, per net ton at mine, Pittsburgh district.

BUFFALO

The market is disturbed by labor troubles and future uncertainty. Anthracite demand again off. Higher prices on bituminous contracts.

Bituminous—There is only a light demand here or eastward. Consumers appear to be well stocked up, though some good sales have been made lately in the Lake Ontario and St. Lawrence River districts. Coal varies about as much in price as ever, the low-priced southwestern bituminous coming in freely. The prospect is good for a price about 12c. over last year, producers maintaining that there is that much additional cost.

The entire situation is much disturbed and unsettled. Shippers do not agree on either prices or prospects. The railroads have dropped all embargoes in this vicinity and are doing better work than for a long time, but the miners are making much trouble. All the Allegheny Valley miners are restless and they will continue so till the final agreement is completed.

Slack is still affected by the Lake opening; consumers have a fair supply. Contracts are generally satisfactory to the seller, as the idea of the additional cost of mining is fully accepted. Following is the Pittsburgh schedule and other prices based upon it:

	Pittsburgh	Allegheny Valley	Penn Smokeless
Lump	$2.95	$2.75	$2.80
Three-quarter	2.85	2.60	.....
Mine run	2.75	2.50	2.60
Slack	2.40	2.30	2.60

Prices are per net ton, except east of Rochester and Kingston, Ont., where they are per gross ton.

Anthracite—The local trade is fair. Some dealers report that they could sell more coal if they could get it. The Lake trade is light on account of the uncertainty over the future of the supply. The operators will not send much coal to the lakes until the agreement with the miners is signed. The car supply is not good and it is the general opinion that it will be worse before it is better.

Shipments by lake for the week were only 46,500 tons, being 18,400 tons to Duluth and Superior, 18,000 tons to Chicago, 8,500 tons to Milwaukee and 1,600 tons to Racine.

The following is the continued winter price at wholesale for anthracite, per gross ton, f.o.b. cars, Buffalo:

Grate	$5.60	Chestnut	$6.10
Egg	5.85	Pea	4.30
Stove	5.85	Buckwheat	3.25

An additional charge of 25c. a gross ton is made for putting coal on vessels.

TORONTO, CAN.

Market Quiet. Anthracite stocks light. Deliveries slow but improving. Opening of navigation.

The trade is generally quiet, as many consumers have laid in supplies for some time ahead fearing a shortage. Stocks of anthracite at the yards are light and deliveries by rail, though improving, are still slow. The first shipments by water will arrive this week.

Prices for best grades per short ton are about as follows with an upward tendency in bituminous. Retail anthracite egg, stove and nut, $8; grate, $7.75; pea, $6.75; bituminous steam, $5.25; screenings, $4.50; domestic lump, $6. Wholesale f.o.b. cars at destination, bituminous three-quarter lump, $3.75; screenings, $3.50; Pennsylvania smokeless lump, $4.50; Pocahontas lump, $5.50; slack, $3.75.

TOLEDO

Big rush of coal boats. Steam consumers using up surplus supplies. Prices strong and steam trade good.

Navigation has opened and nearly 50 boats left Toledo harbor last week. Some were loaded with coal and others are going up light for iron ore.

Owing to the settlement of the wage difficulties at the mines the trade is about normal though prices are much stronger than they were at the same peroid last year. Steam business is generally good. Many local concerns stocked heavily during April, fearing a shortage in event of a strike; they are now using up their stocks and will be in the market again shortly.

COLUMBUS

Considerable activity in the Hocking Valley district. Future prospects are considered bright.

With the signing of the wage agreement in the Hocking Valley district there is renewed activity in the coal trade. Conferences are still being held in the other districts of the state, but no serious trouble is anticipated in arriving at an agreement. The tone of the market is good and preparations have been made for a good season.

Contracting is now rather active as operators in the Hocking Valley district are willing to proceed with the signing of fuel contracts. Several large railroad contracts have been signed and others are pending. Steam contracts are being made at higher figures than prevailed a year ago. Many of the larger steam users have been using their surpluses accumulated prior to Apr. 1.

The Lake trade is opening actively. Navigation is now open in the upper passages and quite a few cargoes have arrived at the head of the Lakes. Little coal is being carried over on the docks in the Northwest.

Circular prices were increased beginning May 1 and little cutting is reported.

Production in the Hocking Valley is gradually being increased and quite a few mines will be placed in commission during the coming week.

	Hocking	Pomeroy	East Ohio		Hocking	Pomeroy	East Ohio
Re-screened lump..	$1.60	$1.70	.....	Egg	$1.30	$1.35	.....
Inch and a quarter.	1.50	1.50	$1.40	Mine-run	1.20	1.20	$1.15
Three-quarter-inch	1.40	1.40	1.30	Nut, pea and slack.	.90	.90	.85
Nut	1.30	1.30	.....	Coarse slack	.80	.80	.75

CINCINNATI

Congestion at Lake ports forces some cheap coal on the local market. More nut and slack available. Contracting active and prospects are generally bright.

The lack of bottoms for handling the heavy tonnages that have been going forward to Lake ports, has forced shippers, in many cases, to divert shipments to this and other inland markets, and as a result some cheap coal has been offered lately. Dealers who have delayed buying for just such opportunities, have been able to lay in some bargain coal.

The increased production of screenings has caused the steam market to ease off, although prices are still good in that line, good nut and slack ranging around 85 and 90c. per short ton f.o.b. mines. Mine-run is not especially strong. The car supply is not all that could be desired, but is improving. Large consumers are signing contracts with little delay, being apparently convinced that further waiting might catch them on a rising market. The general situation is much better than at this time a year ago, and the feeling is optimistic.

DETROIT

Buying of steam coal continues in good volume. Domestic and anthracite are inactive. Lake movement slow.

Bituminous—Orders for steam coal of satisfactory proportions are being received. Most of the business centers in fine coal and there is a less active market for three-quarter lump. There has been a small amount of buying of domestic coal.

Anthracite—Chestnut and stove sizes of anthracite are moving in a limited amount. Interest seems lacking in egg coal. Shippers adhere to winter prices and retailers appear to be holding off in hopes of doing better later.

Lake Trade—Coal is arriving with greater regularity at the loading docks and a large proportion of the freighters upbound are carrying coal just now. With a larger movement of vessels in the iron trade, fewer boats will be available for coal particularly for delivery of cargoes on Lake Michigan. Small-sized carriers are offered at 60c. from Cleveland to Racine, Wis., and a freighter of 4,000 tons capacity was chartered to carry coal from Erie to Chicago at 50c., these rates comparing with a going rate of 30c. last season.

COKE

CONNELLSVILLE

Market continues soft, with no interest in contracts. Production smaller. Large increase in byproduct production due soon.

The coke market continues soft, as it has been in general for two or three weeks, with occasional days on which a slight stiffening appears. There are reports that spot furnace coke has sold at as low as $2, but these reports cannot be verified, as relating to any standard brands. It is generally easy to buy fairly good brands at $2.25, though quotations occasionally run up to $2.50.

The situation is a decidedly disappointing one to producers, since the spot market is now down at least to the level of the contracts now in force. These contracts were made chiefly in late September and early October, and since then there have been many developments of a constructive nature in the iron and steel industry. Pig iron has gone up about $4 a ton, and finished steel about $20, while the country's pig-iron production has increased to a rate that it was not thought could be attained with the blast furnace capacity available. If last September the coke operators had known what conditions in iron and steel would now obtain they would have asked more for their coke, and the buyers would probably have paid more.

With coke plentiful and relatively low in price there is no disposition on the part of furnaces not covered for second-half to enter into negotiations, as it is scarcely conceivable that coke consumption can increase materially, while there are a number of byproduct plants that will go into blast during the next few months.

Foundry coke is showing signs of yielding from the prices hitherto obtained, the decline in furnace coke naturally having an influence, while on account of labor troubles the consumption of foundry coke is less than was expected. We quote: Prompt furnace, $2.25@2.40; contract, nominal, $2.50@3; prompt foundry, $3.75; contract, $3.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Apr. 22 at 446,220 tons, a decrease of 16,700 tons, and shipments at 452,672 tons, a decrease of 1,723 tons.

Buffalo, N. Y.—The market is still weak. It was not expected that the over-production would continue till this time, but it has lasted so long that it has changed market conditions materially. At one time there was no stock coke to be had, but now it is plentiful. A more general quotation than was possible till lately is $5.25 for best Connellsville foundry, $4.45 for furnace, $3.85 for high sulphur and $3.60 for stock.

Chicago—The spot market is strong. Consumers have difficulty in finding enough coke to satisfy their requirements. Top prices are being quoted per net ton, f.o.b. cars Chicago, as follows: Connellsville, $6.50; Wise County, $6.25 to $6.50; byproduct foundry, $6.25 to $6.50; byproduct domestic, $4.50; gas house, $4.50 to $4.60.

MIDDLE WESTERN

GENERAL REVIEW

Spot steam coals bullish. Contracting very active. Smokeless improved. Screenings in strong demand at rising prices.

The outstanding feature of the market this week is the strength of screenings; the supply is insufficient to meet the demand at prices ranging from 1 to $1.10 per ton. Coarse steam coals are also strong at rising prices. Steam-coal users are showing more interest in contracting and renewals at higher prices have been frequent. Many mine crushers are running at full capacity to satisfy the demand for fine coal. Steam sizes of nut are selling up as high as $1.40 per ton.

In the Western domestic trade there is very little business despite chilly temperature and dampness. Retail dealers are giving few orders, evidently believing that buying opportunities will be equally favorable later in the season. Practically all the retail yards throughout the West are bare of storage coal, and operators look for brisk business when stocking commences.

The general undertone is undeniably strong, with little price cutting except on smokeless coals, and with the feeling on the part of operators and shippers that the outlook is very encouraging. Prices hold practically at last week's figures, the tendency if anything being toward higher quotations. The labor situation is steadily becoming more of a factor; many men are leaving Kentucky, Indiana and Illinois mines for Europe to participate in the war and this is causing some consumers to become restive and get under cover with contracts.

Smokeless coals are still demoralized and prepared sizes are in the worst shape. The unsettled labor conditions in the anthracite field have restricted the demand in Western territory, and now that reports from New York indicate a disagreement, some uneasiness among retailers is manifested over their failure to stock up.

CHICAGO

High prices current for screenings. Concessions in smokeless frequent. Domestic demand flat.

Despite the domestic business being very slow, concessions to move tonnage are of no consequence. Accumulations of domestic coals have been reduced by the colder weather. Most contracts for southern Illinois coal are being placed at much higher prices this year. Spot screenings are steadily absorbed from all districts at prices around $1.05 and $1.10. Crushing of mine run is being done to meet the fine coal demand. Carterville No. 5 washed is in strong demand at $1, while No. 1 washed is quiet at around $1.35. Steam lump from the Harrisburg district has been steadily absorbed at prices ranging around $1.50 per ton. Reports from the Western and Northwestern territory indicate the placing of early orders by retailers for domestic shipments from southern Illinois mines. Slight increases have occurred in domestic shipments this week.

Domestic lump shipments from the Springfield district have been at a standstill this week, while screenings have been insufficient to meet the demand. Fine coal prices range from $1 to $1.10 per ton.

Clinton steam coal shows more activity. Screenings from all Indiana districts are bringing close to $1.10 per ton. The continued unseasonable weather has caused a stronger demand for domestic shipments than the same time last year. Prices of all grades show a tendency to advance with steam coals leading.

Smokeless mine-run has sold as low as $1 and lump and egg down to $1.15. The spot situation is slightly easier because consignment coal has been kept off the market. Pennsylvania smokeless is somewhat stronger owing to lack of receipts. Splint sales are being made at $1.40 on contracts, but there is very little activity in the open market. Hocking demand is weak, but the wage settlements will tend to start Lake loading immediately.

Eastern Kentucky shippers are having trouble in moving their domestic sizes. Block has been sold in this market as low as $1.20, and average sales are around $1.25; Millers Creek block has been sold at $1.80; the demand for nut and slack is excellent at the full dollar mark.

Retail dealers show keen interest in the anthracite situation. Indications point to a strong demand after a settlement is made. The current market is very dull, with prices strictly maintained at the circular.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars mines:

	Williamson and Franklin Co.	Springfield	Sullivan	Clinton	Knox and Greene Cos.
Lump	$1.35@1.45	$1.45@1.50	$1.45@1.50	$1.40@1.50	$1.50
Steam lump	1.30	1.25@1.30	1.30@1.35	....	....
2½ and 3-in. lump	....	....	1.35@1.45	....	1.35@1.45
1¼-in. lump	....	....	1.25@1.30	....	....
Egg	1.35@1.45	1.20@1.25	1.30@1.35	1.40@1.50	1.50
Nut	....	1.20@1.25	1.20@1.25	1.35@1.50	1.25
No. 1 washed	1.45@1.50	....	....	....	....
No. 2 washed	1.35@1.40	....	....	....	....
No. 1 nut	1.40@1.45	....	....	....	....
No. 2 nut	1.30@1.35	....	....	....	....
Mine-run	1.25	1.15	1.05@1.15	1.10@1.15	1.15
Screenings	1.00@1.10	1.00@1.10	.90@1.00	1.05@1.10	1.00@1.10

	Harrisburg & Saline Co.	E. Kentucky	Pocah. & W.Va.Smok'l.	Penna. Smokeless	Hocking
Lump	$1.40@1.45	$1.20@1.80	$1.25@1.60	$1.50@1.60	$1.50
1¼-in. lump	1.25@1.30	....	....	....	1.35@1.40
Egg	1.45	1.15@1.40	1.25@1.60	1.50@1.60	1.25
Nut	....	....	....	....	....
No. 1 nut	1.40@1.50	....	....	....	....
No. 2 nut	1.35@1.40	....	....	....	....
Mine-run	1.25	1.20@1.25	1.10@1.35	1.25@1.35	1.15@1.25
Screenings	1.00@1.10	.90@ .95	....	....	....

KANSAS CITY

Both slack and mill have advanced 5c., the price now being $1.45 for slack and $1.65 for mill. This is partly due to the excessive demand from steam consumers and the shortage of screenings. Another phase that has an important bearing is the labor troubles. One large operator has had trouble in the mines, which, with the increasing stir between the labor unions and the railroads, is having an effect on the market. The call for domestic coal is rapidly diminishing, although the price is still firm.

PRODUCTION AND TRANSPORTATION STATISTICS

NORFOLK & WESTERN

Distribution of shipments for January and March follows:

	January			March		
	Shipped	Tipple	Total	Shipped	Tipple	Total
Pocahontas	1,391,079	13,385	1,404,464	1,413,797	12,425	1,426,222
Tug River	343,516	3,623	347,139	338,232	7,689	345,921
Thacker	284,135	5,464	289,599	276,308	6,943	283,251
Kenova	89,459	9,059	98,518	88,440	9,775	98,215
Totals	2,108,189	31,531	2,139,720	2,116,777	36,832	2,153,609

Shipments of coke, entirely from the Pocahontas field amounted to 107,952 tons in January and 145,297 tons in March.

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts in March and the nine months of the fiscal years 1915 and 1916, in short tons:

	March				Nine Months			
Destination	1916	%	1915	%	1916	%	1915	%
Tidewater	430,733	19	314,726	22	3,897,620	20	2,675,382	17
East	302,110	13	205,419	14	2,094,553	11	1,885,871	12
West	1,315,163	57	811,645	57	11,726,614	60	10,111,010	65
Total	2,048,006		1,331,790		17,718,787		14,672,263	
From Connections								
Bituminous	250,210	11	104,007	7	1,691,100	9	833,501	6
Anthra. (local)	128		158		1,445		406	
Anthracite	651		283		11,118		10,706	
Total	2,298,995	100	1,436,238	100	19,422,450	100	15,517,063	100
Coke	48,178		18,373		329,991		134,996	

BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during March and the previous two months:

	January		February		March	
	1916	1915	1916	1915	1916	1915
Coal	2,707,785	2,293,406	2,666,007	1,906,210	2,763,165	2,094,607
Coke	382,692	221,395	378,461	232,111	400,518	257,099
Total	3,090,477	2,514,801	3,044,468	2,138,321	3,163,683	2,351,706

COAL EXPORTS

Exports of domestic coal and coke from the United States, and bunker coal laden on vessels engaged in the foreign trade, at the specified districts during the month of February, 1916, was as follows:

Districts	Anthracite	Bituminous	Coke
Maine and New Hampshire	375	76	
Vermont	733	2,322	53
Massachusetts	1		
St. Lawrence	75,545	67,586	2,120
Rochester	2,797	26,594	412
Buffalo	189,752	323,676	38,963
New York	8,740	1,245	817
Philadelphia	1,429	33,607	96
Maryland	126	68,642	3,525
Virginia	126	373,579	6,852
South Carolina		2,223	
Georgia		5	
Florida		2,530	
Mobile		75	
New Orleans		468	79
Laredo		7,903	4,092
El Paso	83	3,006	1,928
Eagle Pass		1,332	360
Arizona		6,132	11,899
Southern California	12	111	
San Francisco		73	4
Washington		1,464	5,631
Dakota	9,718	8,111	178
Duluth & Superior	4,121	18,118	68
Michigan	109	85,487	11,038
Ohio		7,355	
Total	293,541	1,041,920	88,115

BUNKER COAL

Maryland	27,031	Philadelphia	29,231
New York	262,305	Virginia	118,543

PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for March and the three months of 1915 and 1916, in short tons:

	March		Three Months	
	1916	1915	1916	1915
Anthracite	1,120,060	814,872	3,228,518	2,472,278
Bituminous	4,203,171	3,243,270	12,719,170	9,771,261
Coke	1,357,004	876,532	3,678,339	2,301,767
Total	6,680,235	4,934,674	19,626,027	14,545,306

I. C. C. DECISIONS

I. C. C. No. 6260—Salem Iron Works vs. Southern Pacific Co. (Submitted Nov. 19, 1915. Decided Mar. 31, 1916.)

Rate of $3.094 per gross ton charged for the transportation of coke from Wilkeson, Wash., to Salem, Ore., found to have been unreasonable to the extent that it exceeded $2.55 per gross ton. Reparation awarded.

I. C. C. No. 7792—International Fuel Co. vs. Spokane International Railway Co. (Submitted Nov. 8, 1915. Decided Mar. 31, 1916.)

Charges collected on a carload of coal from Corbin, British Columbia, to Spokane, Wash., not found to have been based on an erroneous weight.

Fourth Section Application No. 10167—Bituminous Coal from Points on the Pennsylvania R.R. and its Connections. (Submitted Jan. 10, 1916. Decided Apr. 11, 1916.)

Application for authority to establish rates on bituminous and cannel coal from points on the Pennsylvania R.R. and its connections to water competitive points on the Maryland-Delaware peninsula lower than rates contemporaneously applicable on like traffic to intermediate points denied.

No. 7860—Ulland Coal Co. vs. Louisville & Nashville R.R. Co. Submitted Nov. 2, 1915. Decided Apr. 4, 1916.

Rates charged for the transportation of coal in carloads from various points on the Louisville & Nashville R.R. in Kentucky and Tennessee to Hunt St., Cincinnati, Ohio, found not to have been unreasonable and reparation denied.

FOREIGN MARKETS

GREAT BRITAIN

Apr. 19—The scarcity of coal continues. Bests and seconds are quite unobtainable and it is becoming increasingly difficult to find even mixed lots for bunkers. Prices are purely nominal. Quotations are approximately as follows:

Best Welsh steam	Nominal	Best Monmouthshires	$12.00
Best seconds	Nominal	Seconds	11.40
Seconds	$12.00	Best Cardiff smalls	6.60
Best dry coals	10.80	Cargo smalls	5.40

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freight—Chartering is practically at a standstill, owing to want of coal. Rates in most directions are distinctly easier and are approximately as follows:

Gibraltar	$12.00	Naples	$19.20	St. Vincent	$11.40
Marseilles	21.23	Alexandria	26.40	River Plate	14.40
Algiers	17.40	Port Said	25.20		
Genoa	19.20	Las Palmas	10.80		

Exports—British exports for March and the three months of the past three years were as follows:

	March			Three Months		
To	1914	1915	1916	1914	1915	1916
Russia	175,134	.....	.....	552,555	.....	.....
Sweden	239,201	257,038	130,434	746,078	757,277	372,094
Norway	233,444	296,307	192,740	695,324	692,344	522,444
Denmark	271,695	285,880	211,886	719,769	733,007	602,511
Germany	737,017	.....	.....	1,875,014	.....	.....
Netherlands	151,146	169,040	59,871	418,192	437,652	265,835
Belgium	140,314	.....	.....	491,991	.....	.....
France	1,235,041	1,275,725	1,359,481	3,791,450	3,919,763	4,034,446
Portugal[1]	123,867	117,211	90,643	352,862	299,307	269,086
Spain[4]	319,617	156,388	142,989	958,922	539,043	561,614
Italy	736,565	714,993	426,276	2,392,315	1,760,022	1,320,964
Aus. Hung.	63,444	.....	.....	218,190	.....	.....
Greece	60,567	47,734	19,273	187,029	111,778	38,699
Roumania	37,991	.....	.....	46,325	.....	.....
Turkey	68,340	.....	.....	171,634	.....	.....
Algeria	105,528	76,041	70,806	321,854	252,695	223,824
Portuguese[6]	18,927	24,630	38,621	62,976	65,537	76,247
Chile	64,822	3,551	889	146,858	12,840	1,718
Brazil	112,893	50,616	36,702	394,219	163,504	99,285
Uruguay	63,287	43,370	37,932	184,112	128,675	87,541
Argentine	330,800	168,567	69,262	1,011,746	537,871	332,079
Channel Is.	16,661	15,194	5,199	41,451	32,295	24,304
Gibraltar	44,964	32,472	37,238	97,313	102,760	123,464
Malta	69,102	6,025	6,354	148,923	28,694	22,447
Egypt[2]	302,725	125,967	51,362	883,004	396,697	172,502
Aden[3]	29,091	.....	.....	52,651	22,095	5,336
India	18,618	1,620	92	40,300	10,910	8,615
Ceylon	21,971	1,505	.....	86,716	17,131	12,856
Miscell'ous.	116,950	107,399	44,883	340,596	197,829	112,917
Coke	82,898	68,281	139,457	301,749	235,174	368,244
Briquettes	178,100	98,202	109,403	502,181	243,348	316,204
Total	6,170,720	4,143,756	3,281,793	18,234,299	11,698,248	9,975,276
Bunker	1,689,304	1,300,467	1,037,384	5,035,448	3,978,631	3,273,224

[1] Includes Azores and Madeira. [2] Including Anglo-Egyptian Sudan. [3] And dependencies. [4] And Canaries. [5] West Africa.

Note—The figures in the above table do not include Admiralty and certain other shipments.